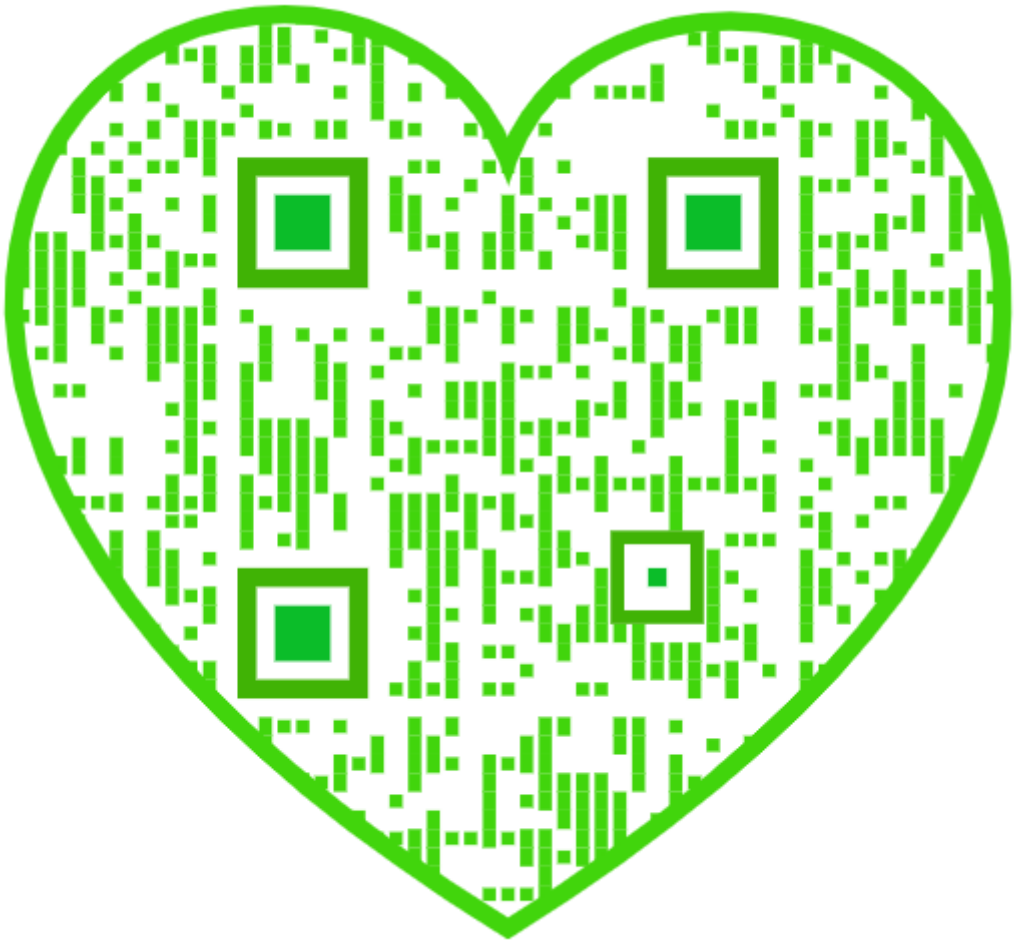

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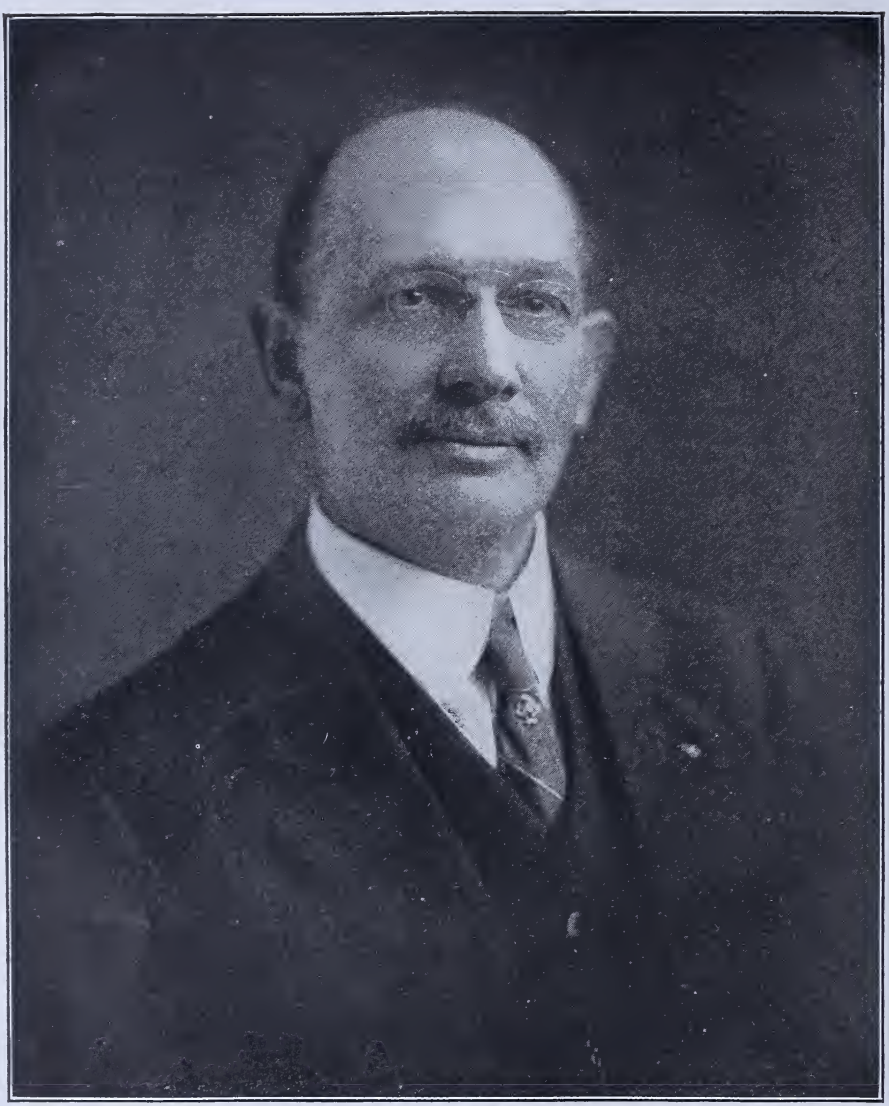

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Complete Guide to Prevention and Cure of Disease

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TWENTY BOOKS—ONE VOLUME

BY

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GENERAL ARRANGEMENT

Although contained in one volume this work is divided into twenty Books, which in their turn are subdivided into chapters or parts.

At the back of the whole work will be found a complete General Index of all matters contained in the different Books and their subdivisions, so that any disease or any remedy in any part of the work may be quickly located. But, in addition to this General Index, each chapter or part is prefixed with a special index of its own, thus giving immediate location of items to be consulted in the special subject at the time under consideration. For example, let us take the common disease Asthma. On consulting the General Index we find the main article to be on page 523. Turning to the index at the beginning of this chapter (Part VI. of Book IV) we may find the causes, symptoms and varieties of Asthma.

If what we wish is not found in this general article, we again refer to the General Index; and we have special treatments of the disease in other parts of the work, such as Simple Remedies, Prescriptions, Homeopathic Treatment, Exercises, etc. This plan has been carried out all through the work.

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Head, " " 36
Leg, " " 60

Book I.

THE HUMAN BODY.

A Description of the Colored Anatomical Charts Composing the Manikin Accompanying this Work.

CHART I.

A PICTURE OF GOOD HEALTH.

This exquisitely beautiful and artistic Anatomical Plate presents the head and face of a young man in the enjoyment of perfect health. Apart from the subject it so accurately and faithfully represents, it is in itself a valuable life-like portraiture of the human head and face, and shows to what perfection the art of anatomical plate printing has attained. Note the prominent perceptive faculties, the high forehead, features characteristic of a large brain and a massive and unimpaired intellect. Mark the open expression of the eye! how true to nature and life-like. Observe the compressed lips, denoting firmness of character and determination of purpose. Look attentively at the bright, open, manly countenance; there are no signs of mental decrepitude, physical bodily infirmities, nervous fear, or exhaustion of brain power or life-force in the expression of the noble, ruddy and healthy face. It is, as its name implies, typical of *Perfect Health!*

Muscles of the Face and Neck.—This fine plate is a remarkably realistic and accurate representation of the head and neck, after the outer skin has been removed. It shows the bare skull, together with the admirable and skilful arrangement of the muscles of the face and neck; also the external part of the ear. There are, also, numerous blood-vessels noticed meandering over the parts exposed to view, by means of which this muscular area receives its supply of nutrient blood. The large, broad muscle observed over the forehead is the one by which we elevate the brow, and in conjunction with the orbicular muscle that is seen surrounding the eye, we can contract the brow, as in "scowling."

Muscles of the Face.—The muscles of the face are those employed to give variety of expression to the countenance It is through the medium

of these small but useful muscles that public speakers can give facial emphasis to their flow of rhetorical eloquence; the tragedian employs them to give dramatic effect to the various characters he impersonates, and the low comedian and "clown" cultivate them for facial contortion and "guying" characterization. The numerous muscles observed about the neck are those which give elasticity and mobility to the head. It is by means of these muscles that the head can rotate on its axis, bend forward, backward, sidewise, and pose in the diversified attitudes and various positions it can be made to assume.

THE BRAIN; AND A VERTICAL SECTION OF THE FACE AND NECK.

What the Plate Shows.—As we progress in our anatomical course of study, our attention is firmly and deeply fixed in wonder and amazement at the marvelous mechanism revealed in the sublime profundity and grandeur brought out in this magnificent artistic plate. It brings before our astonished vision the beautiful proportions and symmetry of the human brain as it lays *in situ* within its bony castle; and as we look upon its wavy convolutions we naturally turn our thoughts to the hidden mysteries of mind and to its superiority over matter, and to the illimitable intellectual properties, powers and capacity of the mind, that lay quietly slumbering in the depths of the human brain, for the mind of man surpasseth all things of human conception or construction. Below this mighty throne of reason and intelligence, on the left, we observe the cerebellum or lesser brain, the fount from whence all the vegetative or organic functions of life—as respiration, beating of the heart, digestion, etc.—receive their inspiration and supply of vital force.

View of the Eye.—We can likewise view the human eye as it lays in position in its bony socket, and wonder at our Creator's munificence and benevolence in providing us with such a delicate instrument of vision with which to light our way about in the world, and view the magnificent beauties of nature that surround us on every hand. Here, too, we observe the teeth, those essential pre-requisites to personal beauty, and valuable adjuncts to the powers of articulation and speech, protruding through the gums, their roots being visible above and below the gums; and in the lower set we see the dental nerve distributing its nervous supply to their individual and collective roots.

The Neck Muscles.—This beautiful illustration brings out in bold relief the superficial and deep muscles of the neck, and, at the same time, we observe a faithful delineation, not only of the relative position of the

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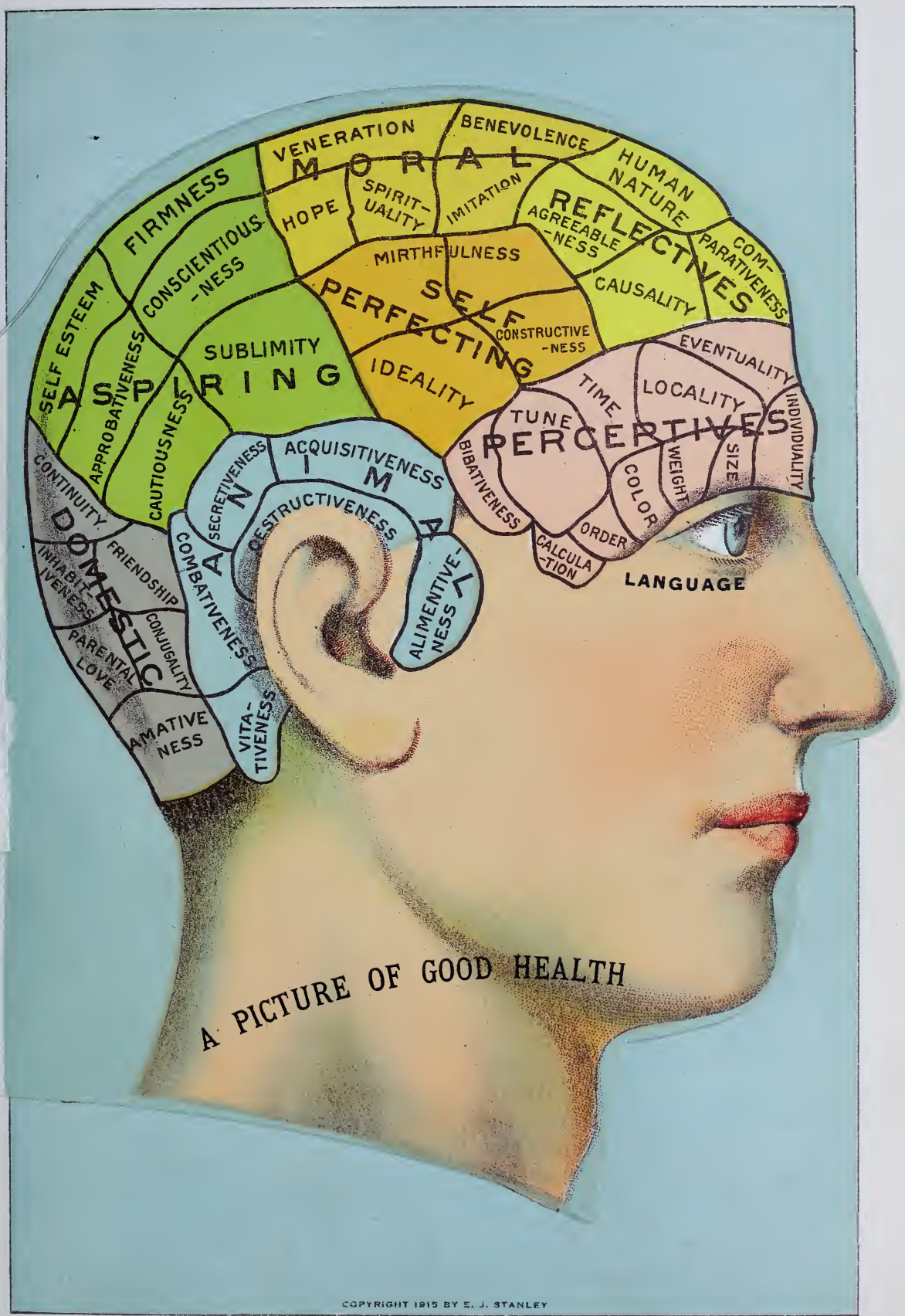

A PICTURE OF GOOD HEALTH

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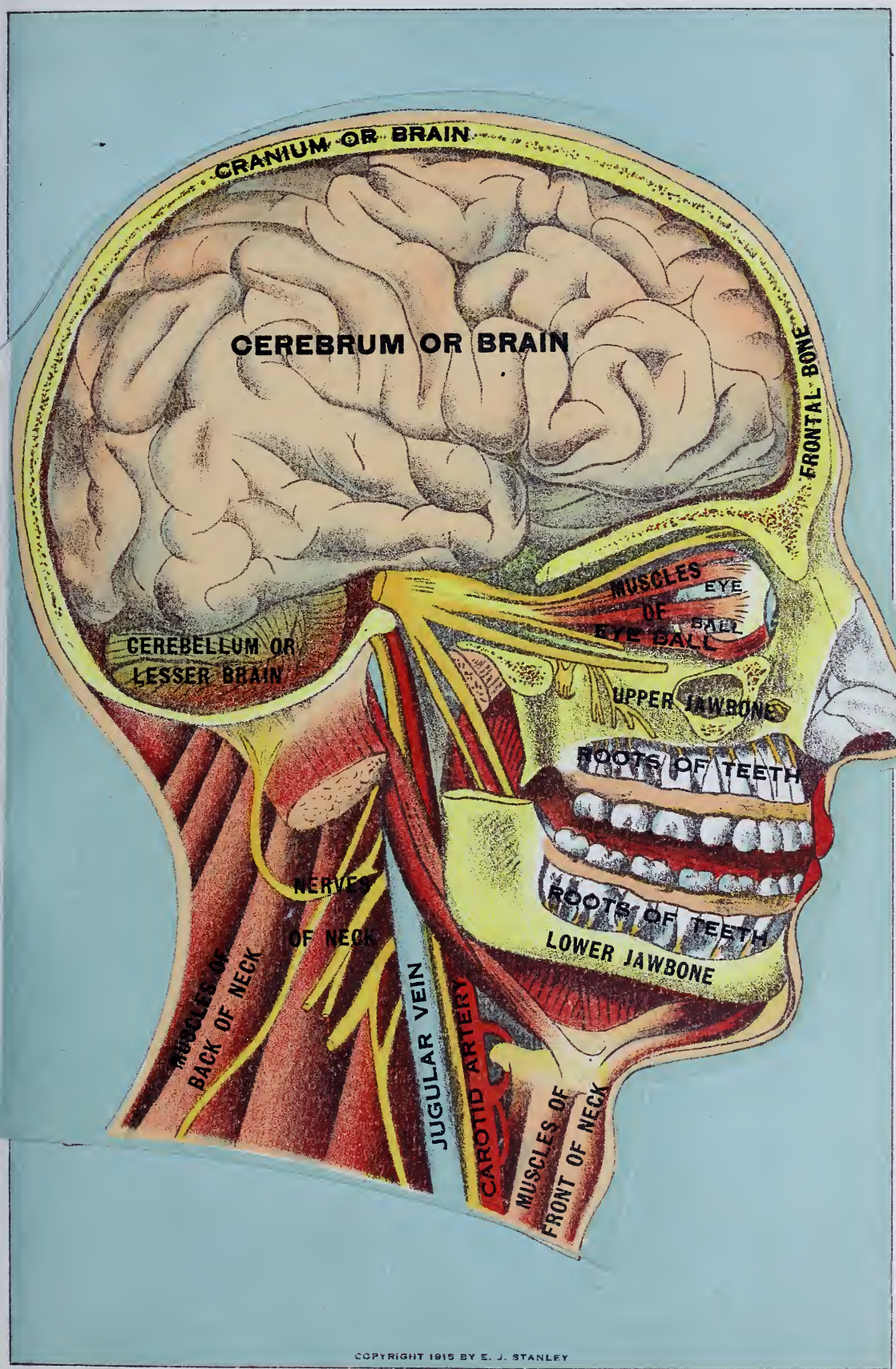
CHART 1.

MUSCLES OF THE FACE AND NECK
MUSCLES OF THE EYELID
MUSCLES OF EXPRESSION
MUSCLES OF MOUTH
MUSCLES OF THE EAR
MUSCLES OF THE NECK
MUSCLES OF THE SHOULDER BLADE



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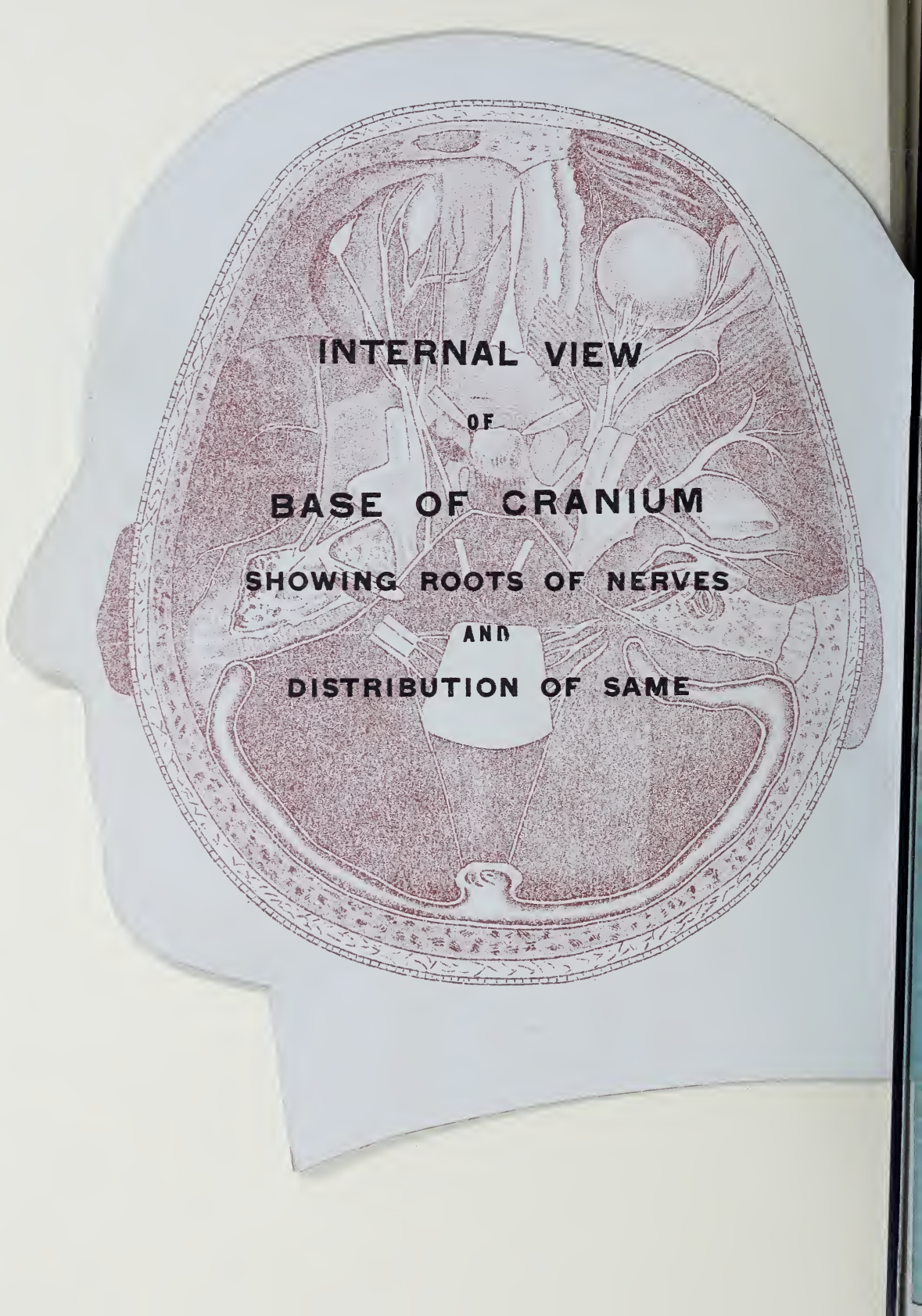
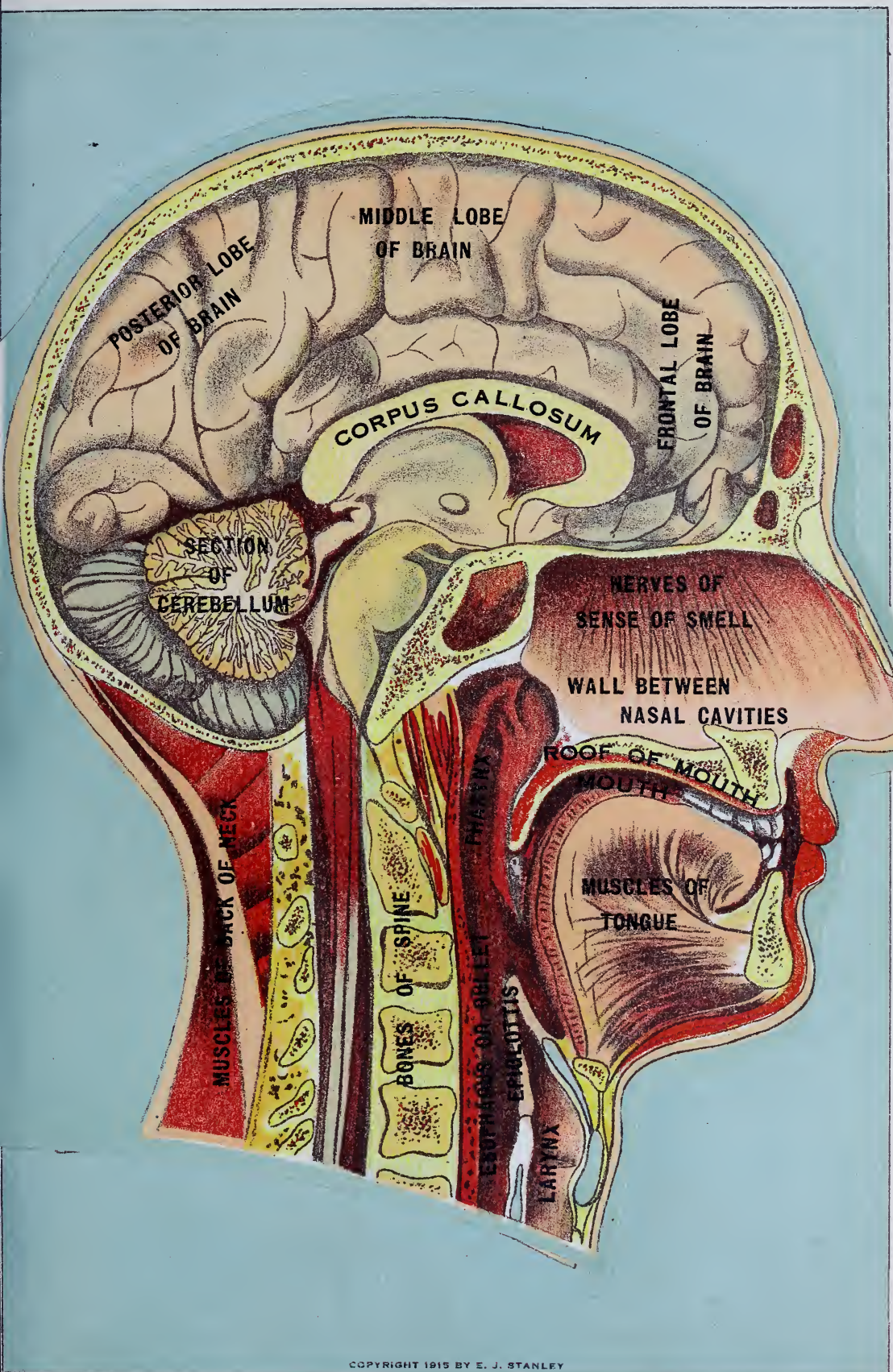

INTERNAL VIEW
OF
BASE OF CRANIUM
SHOWING ROOTS OF NERVES
AND
DISTRIBUTION OF SAME



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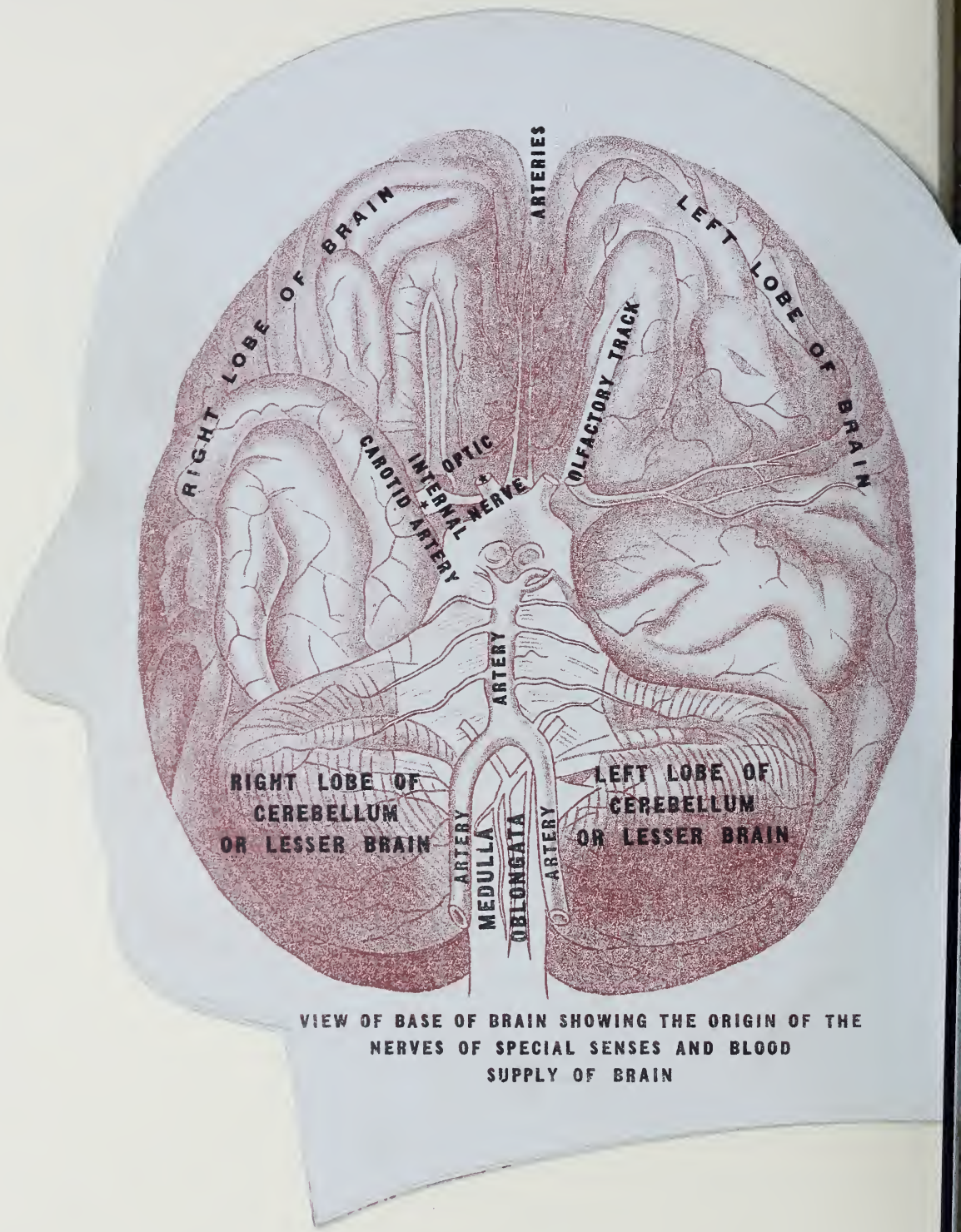

VIEW OF BASE OF BRAIN SHOWING THE ORIGIN OF THE NERVES OF SPECIAL SENSES AND BLOOD SUPPLY OF BRAIN

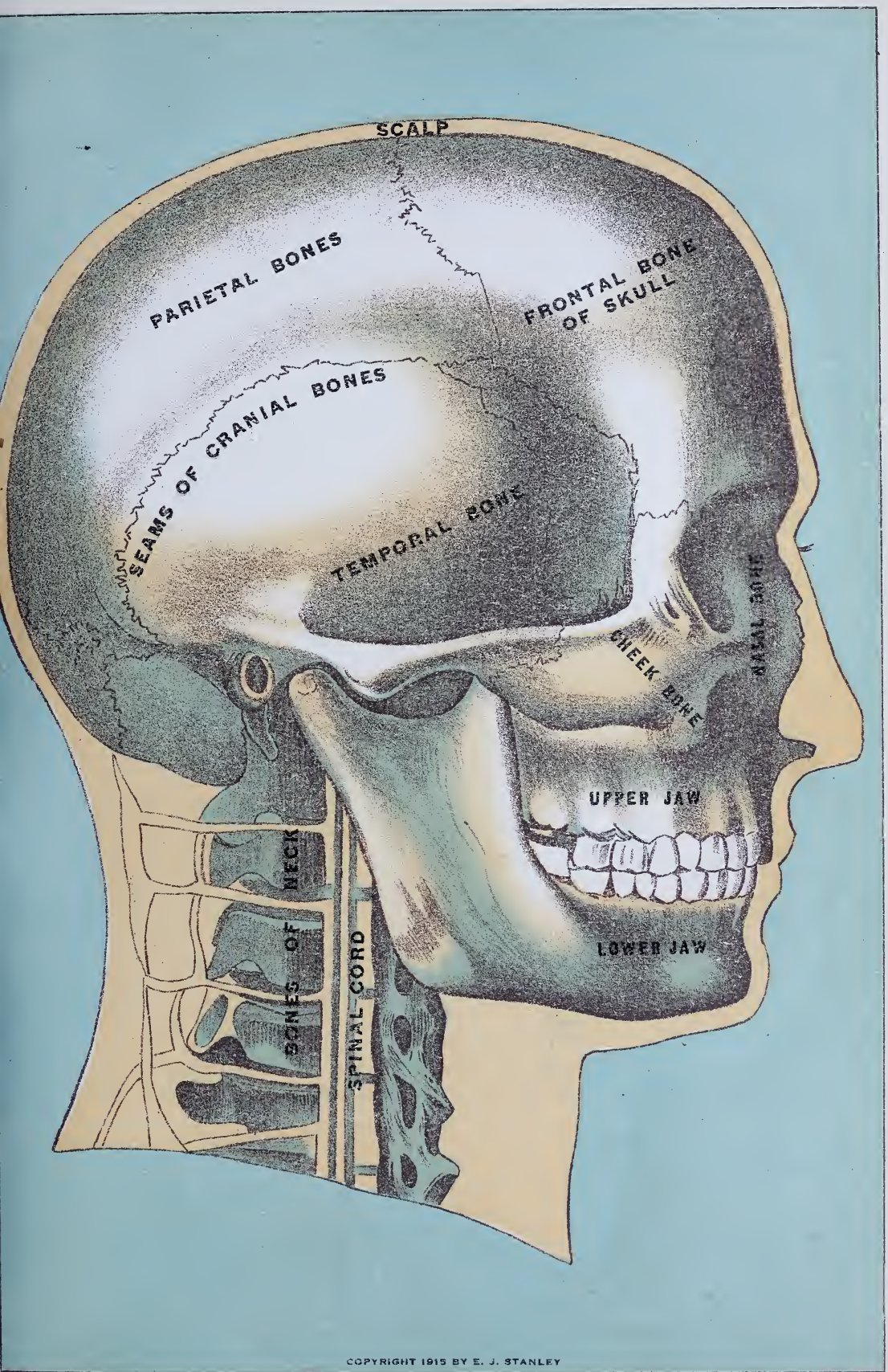

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CHART 1.

carotid artery and jugular vein, but also of the manner in which the muscular and fleshy part of the neck receives its nervous supply.

VIEW OF THE BASE OF THE CRANIUM.

Brain Cavity.—Here in this remarkable illustration we have presented to us one of the most wonderful views in the anatomy of the skull, or, in fact, of any part of the human frame. It is a view of the floor of the cranial cavity on which that curious and mysterious, but sublime organ, the brain, rests. The marvelous skill and ingenuity therein displayed, of the complex mechanism surveyed, the beautiful and intricate manner in which the nerves of special sense are so elaborately set forth, the complicated profusion and exquisite design manifest in the distribution of blood-vessels for the nourishment and support of the special organ of reason and intelligence—all claim our closest and undivided attention, and we are unconsciously led to revere the Omniscience of Him who could conceive of such intricate architecture, and perform such delicate, unique and perfect workmanship. The large opening observed in the floor of the cranial cavity is the *foramen magnum,* through which the spinal cord, together with the cerebro-spinal nerves, escape.

SECTIONAL VIEW OF THE BRAIN, FACE AND THROAT.

The Brain in its Bony Citadel.—The artist, with true anatomical instinct and a rare technical ability in regard to accuracy and minute detail, has performed his part of the work in this illustration with such faithful fidelity to nature that one cannot withhold a word of praise at the grand style and elaborate manner of its execution. This elegant and artistic anatomical plate represents the brain held firmly in position within its strong, bony citadel, but cleft in twain from above downward, thus showing its internal mechanism and construction; besides which it gives the internal arrangements of the nose, tongue, throat and neck.

Order of Brain Mechanism.—Commencing from above and descending downward we observe the following important structures, to wit: The fascia or skin covering the cranial bones; and then a section of the bones themselves, showing their laminated structures. Between the bones of the skull and the brain are seen the meningeal coats of the brain, which serve the double purpose of supplying it with blood-vessels and protecting that delicate organ from pressure or injury.

Cerebrum and Cerebellum.—We observe that the cerebrum, the seat of mind and volition, is much larger than the cerebellum or little brain;

and as though that was not enough area for the evolution of the mind, we see this part of the brain most curiously wrinkled and folded into various sized convolutions, thus increasing the mental surface. The more numerous these convolutions are, the higher and more noble the mental faculties and intellectual powers become. The hemisphere of the brain, here shown, is seen to be divided into three lobes, the frontal, middle and posterior. The *Corpus Callosum,* or the great commissure of the brain, is most faithfully represented, and immediately below is seen the *Fornix.* The peculiar appearance of the cerebellum or little brain presents a tree-like resemblance, whence it is called the *arbor vitæ,* or the tree of life.

The Olfactory Nerve.—The olfactory nerve is graphically displayed, branches of which are seen passing in all directions over the mucous membrane of the nose. A little to the left of the olfactory nerve is seen the posterior nares, and immediately below the pharynx and epiglottis, the œsophagus or gullet, the larynx and trachea or wind-pipe.

The Tongue.—The tongue, or organ of taste and instrument of speech, is most accurately represented, the muscular fibres of which are seen running in different but determinate ways, thus giving to this important organ variety and regularity of motion and aiding it to assume numerous shapes and forms. The cervical portion of the spinal column is seen, with the fleshy part of the back of the neck attached. This plate is one that commends itself to our deep and careful study.

VIEW OF THE BASE OF THE BRAIN, AND THE THOUGHTS IT SUGGESTS.

Shape of Brain.—As so graphically delineated in this beautiful as well as natural illustration of the human brain, we glean a knowledge of the origin and source of its blood supply; the arteries are observed to distribute numerous branches in various directions along and over its surface, many of which penetrate its substance. As noticed, the brain presents an ovoid or egg-shaped appearance, divided into two equal, lateral halves—hemispheres as they are called—thus virtually giving us two brains, the same as we have two eyes, two arms and two legs. With this surplus of brains, as it were, at our command, we are naturally led to ask the question, who can define the metes and bounds of the mind? Or describe the limits of our intellectual capacity? Who can fathom the depths of thought? Or circumscribe our mental, educational or scientifical acquirements, when health crowns the human temple with its rubicund mantle? Echo answers who!

Beauty of the Brain Views.—Every view of the human brain we have

seen in this series of magnificent and unparalleled anatomical plates has inspired our admiration and held us spell-bound in utter astonishment and amazement at the limitless attributes, the diversified powers, and the variety of functions this wondrous and mysterious organ is called upon to perform in the hourly transaction and business pursuits of daily human life. And yet, notwithstanding the marvelous properties of this elaborate organ, it is the least solid and most unsubstantial looking body of the human casket.

Consistency of the Brain.—It consists of eighty per cent. of water, seven per cent. of albumen, some phosphorized fat and a few other minor substances. Such is the composition of the mighty and powerful organ which rules the world. Whilst the brain is the seat of sensation, yet it can be cut, burned or electrified without causing pain in itself. Strange, passing strange, are the properties and powers of the brain!

BONES OF THE HEAD, FACE AND NECK.

Bones of the Skull.—This illustration gives an accurate and faithful representation of the head, face and neck, surrounded by an outline of the fleshy parts as they appear in the human frame. The bones of the head, eight in number, constitute the skull, and those of the face, fourteen in number, compose a strong, hard, bony case, which encloses and affords a suitable protection for the brain and the four organs of special sense, *viz.:* sight, smell, taste and hearing. All of these bones are immovable, except the lower jaw, which moves by means of a hinge-joint, and permits of the opening and closing of the mouth.

Bones Seen in the Plate.—The bones of the skull observed in this beautiful plate are: the frontal, which forms the forehead or front part of the skull; the parietal, constituting a portion of the side and top of the head; the occipital, forming the lower and back part of the skull, and the temporal, which forms the lower part of the side and a part of the base of the cranium. These several bones are joined together by notched seams, after the manner carpenters call "dove-tailing."

Shape of the Skull.—The skull, as will be seen, is oval, which adapts it to the conformation of the brain, besides giving it greater resistance to pressure. The stronger and smaller end is in front, where danger is greatest to the brain, whilst the projections before and behind shield its less protected parts. The peculiar conformation and shape of the skull forms a strong shelter for the brain—an organ so delicate that if not so strongly guarded from injury, an ordinary blow falling upon it would destroy it forever.

Bones of the Face.—The bones of the face shown in this plate are the nasal bone, forming the arch of the nose, the malar, which gives prominence to the cheek, the upper jaw, containing the upper teeth, and the lower jaw, containing the under teeth.

The Spinal Column.—That portion of the spinal column noticed in the illustration consists of the cervical vertebræ. Each vertebra is composed of a body, with seven spinous processes projecting from it. The body is perforated by a ring, through which is seen running the spinal cord, giving off nerves between each separate bone. A ring of cartilage is seen inserted between each separate vertebra, the object of which is to prevent any jar reaching the brain when we run, jump, walk or stumble.

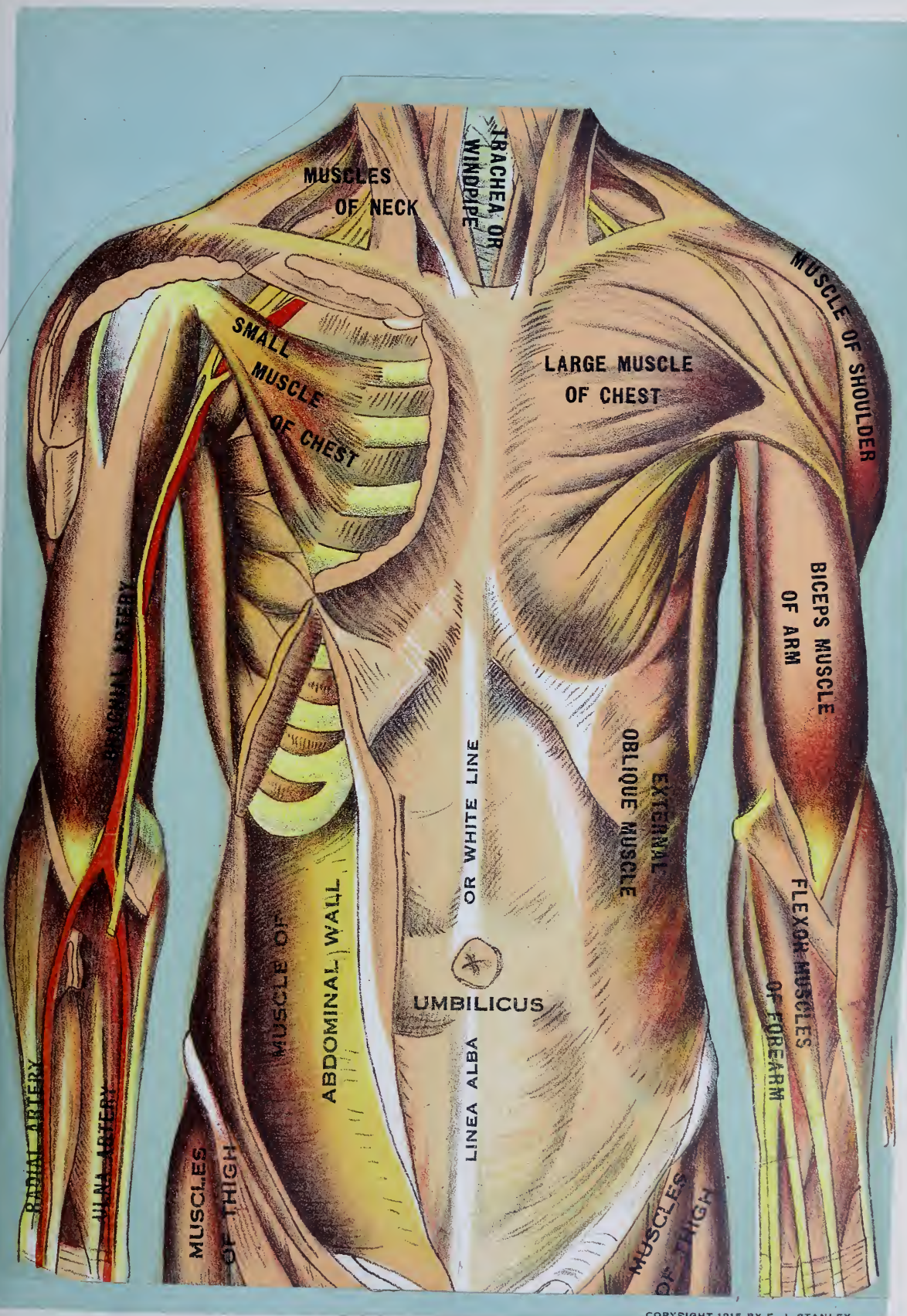
CHART II.

THE INTERNAL WONDERS OF THE HUMAN BODY REVEALED.

THE HUMAN BODY AND ITS MARVELOUS PERFECTION.

Wonderful Structure of the Body.—The human body is the highest form of animal life. It is full of beautiful proportions and divinely symmetrical in shape, form, mould and outline. We look with honest pride and glowing admiration upon the many accomplishments that man has achieved in the world around us. We see his skill displayed in the various arts and sciences, and we look with awe upon the projects of his intellect and reason, the realization of which is but a small question of time! We boast of our ships, our steamboats and our steam cars; we are justly proud of our bridges, our viaducts and the progress of our engineering skill; we grow enthusiastic over our telegraphs, our telephones, our electric lights; we feel a degree of national pride in the achievements and successes of Edison, the wizard of Menlo Park; but where, let us ask, in the whole range of events, the acquirements of arts, the accomplishments of mechanics, the achievements of architecture, the attainments of engineering, or the successes and promises of electrical sciences, can we find such another structure as the human body, that curious, yet perfect world of wonders!

Man the Most Complex Body.—It embodies an epitome of the whole universe! Man is more elaborate, more complex, more God-like, than any other living organism; more wonderful, more beautiful, more marvelous, than any work of human ingenuity, conception or construction.



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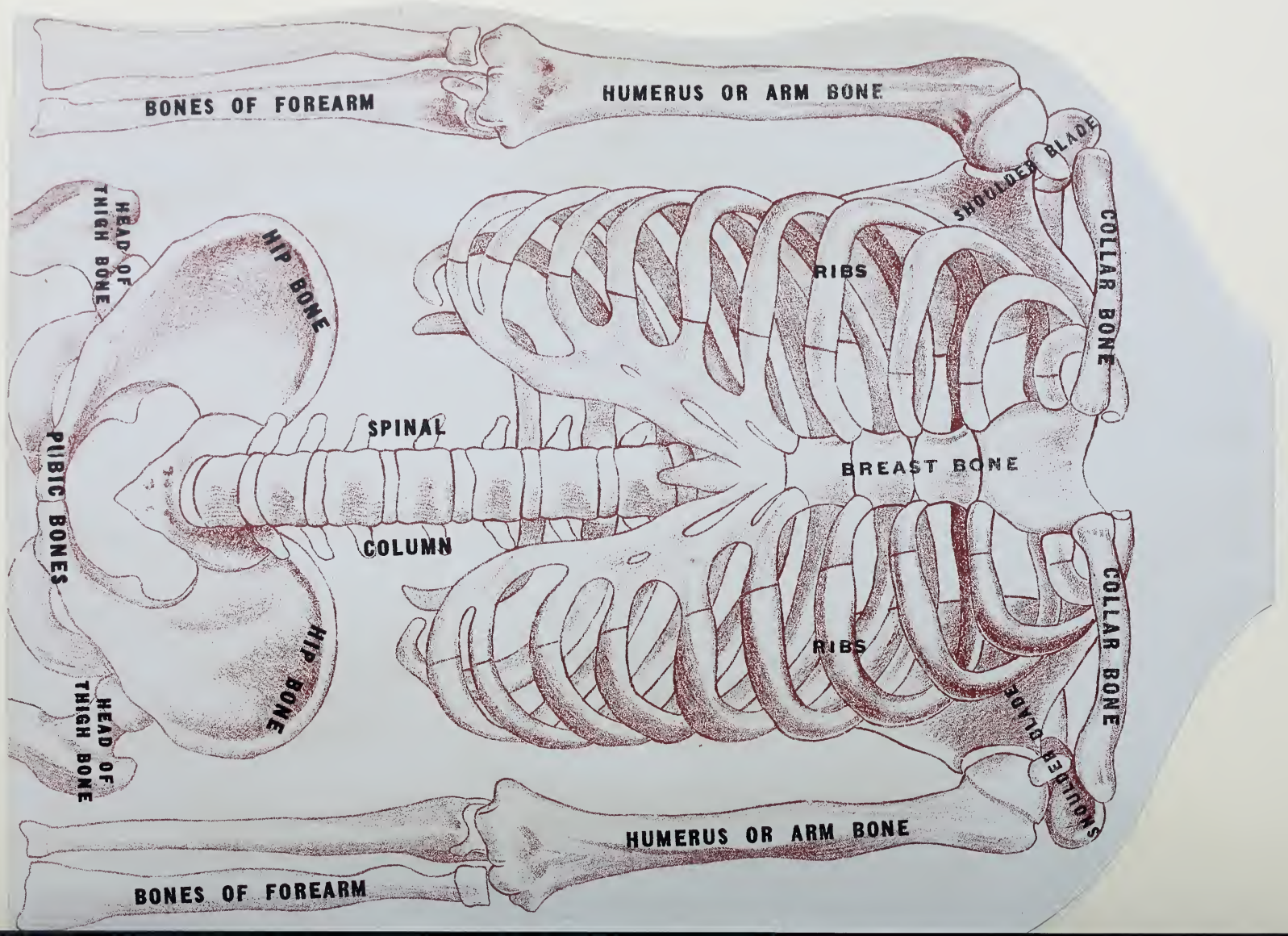
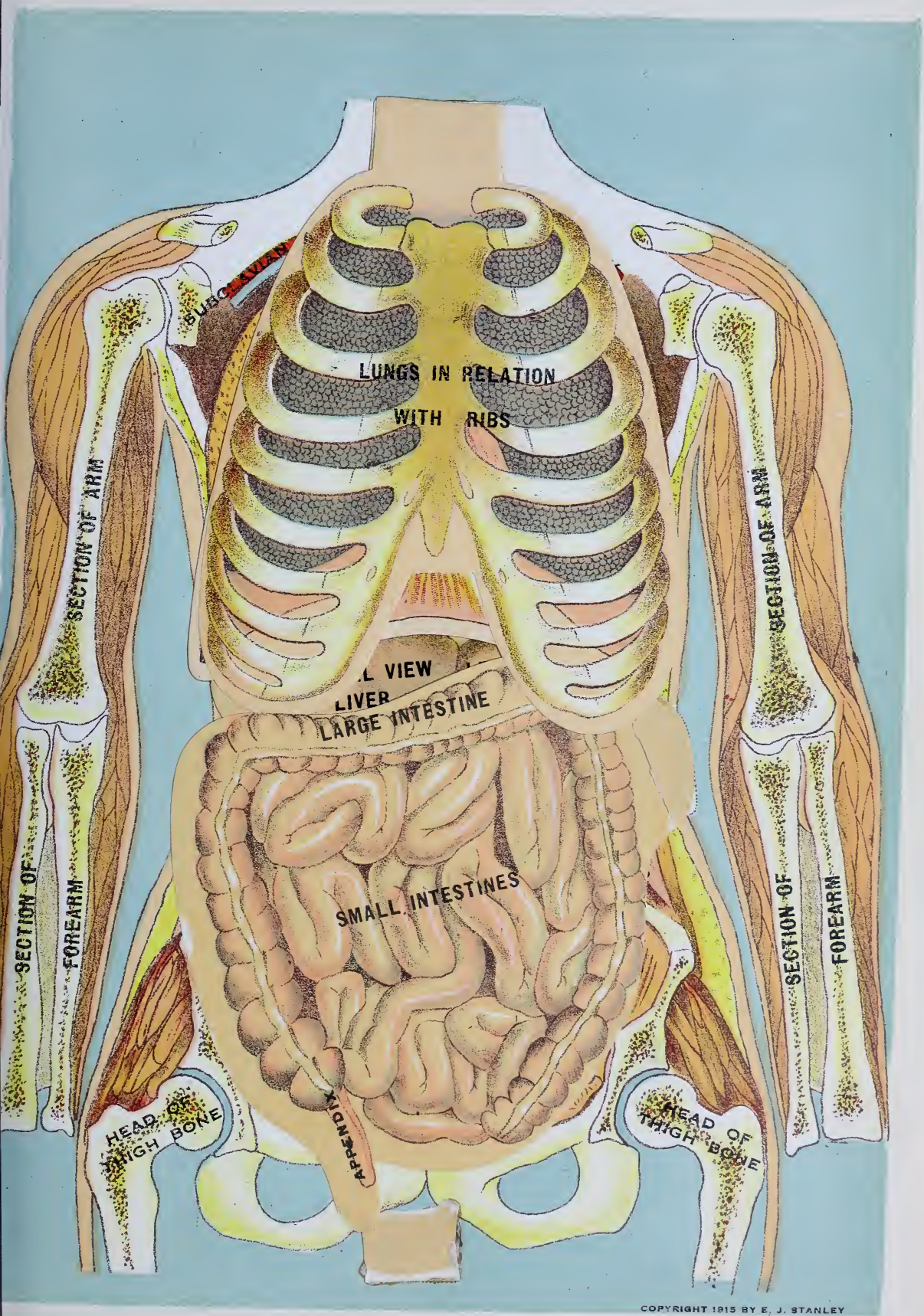

BONES OF FOREARM
HUMERUS OR ARM BONE
SHOULDER BLADE
COLLAR BONE
HEAD OF THIGH BONE
HIP BONE
RIBS
SPINAL
COLUMN
BREAST BONE
PUBIC BONES
HIP BONE
HEAD OF THIGH BONE
RIBS
COLLAR BONE
SHOULDER BLADE
HUMERUS OR ARM BONE
BONES OF FOREARM


LUNGS IN RELATION
WITH RIBS
SECTION OF ARM
SECTION OF ARM
L VIEW
LIVER
LARGE INTESTINE
SMALL INTESTINES
SECTION OF FOREARM
SECTION OF FOREARM
HEAD OF THIGH BONE
HEAD OF THIGH BONE
APPENDIX
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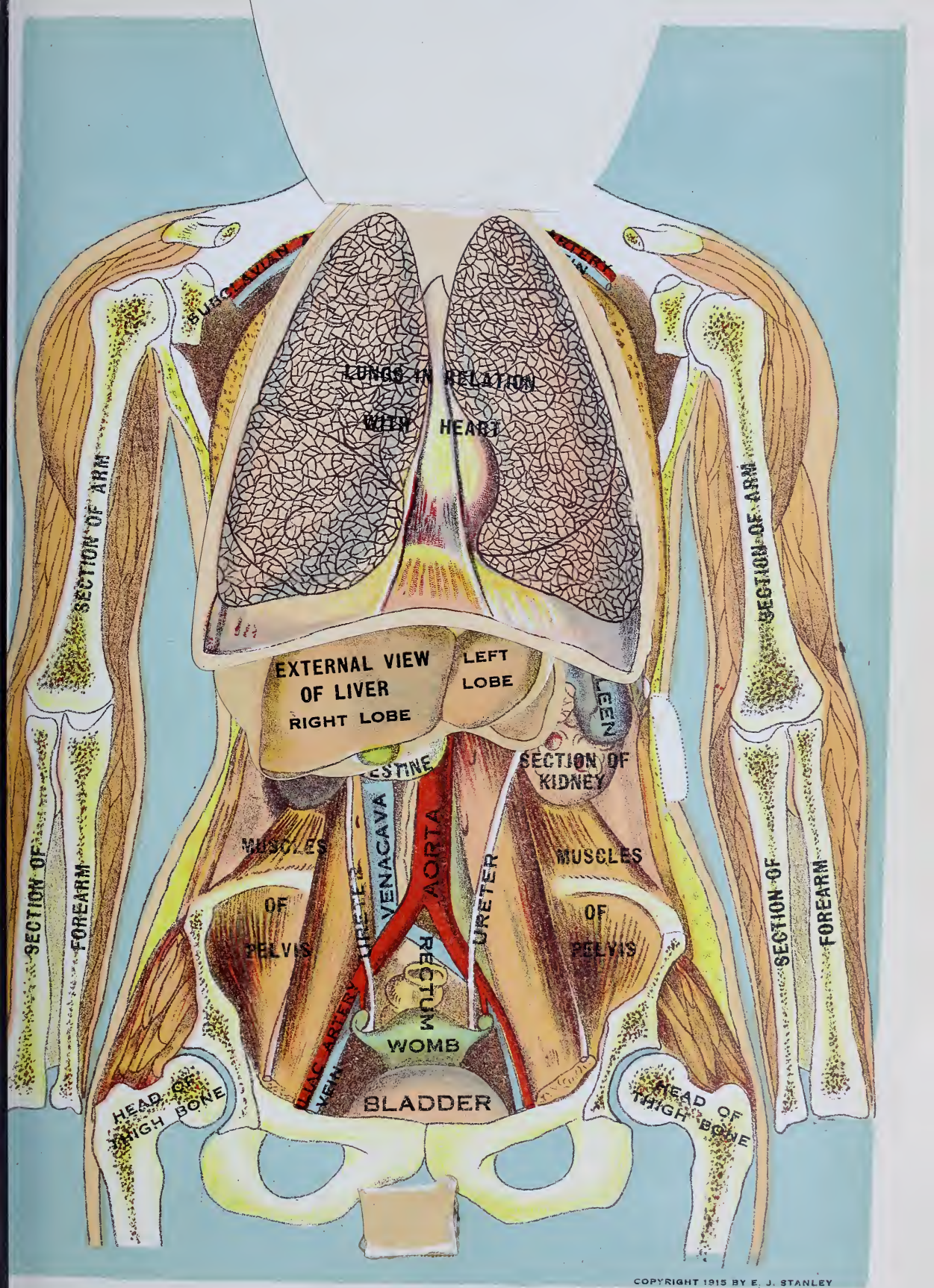

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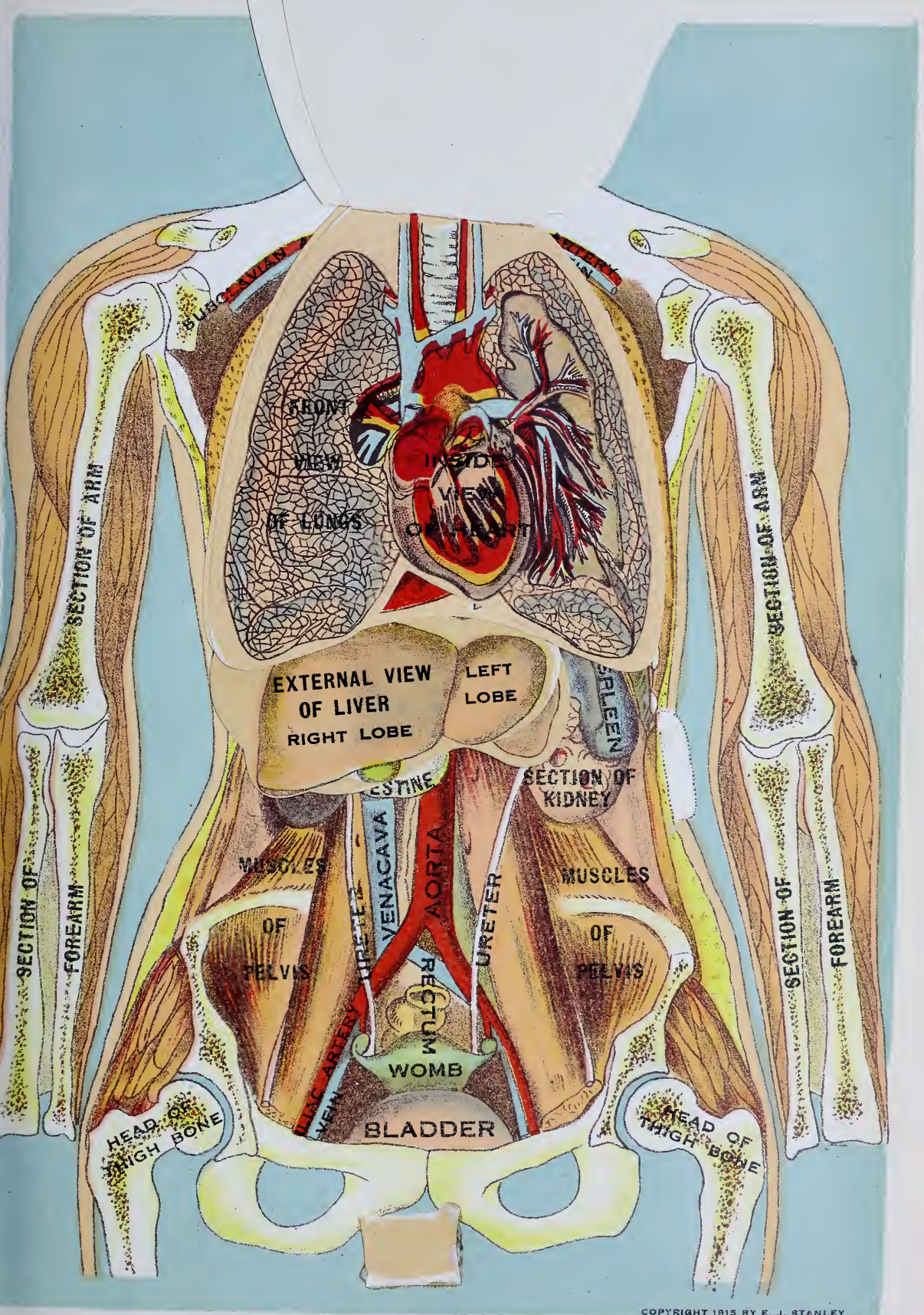
SUBCLAVIAN
ARTERY
SUBCLAVIAN
VEIN
FRONT VIEW OF LUNGS
INSIDE VIEW OF HEART
SECTION OF ARM
SECTION OF ARM
EXTERNAL VIEW OF LIVER
RIGHT LOBE
LEFT LOBE
SPLEEN
SECTION OF KIDNEY
INTESTINE
VENACAVA
AORTA
URETER
URETER
MUSCLES OF PELVIS
MUSCLES OF PELVIS
SECTION OF FOREARM
SECTION OF FOREARM
RECTUM
WOMB
BLADDER
ILIAC ARTERY
VEIN
HEAD OF THIGH BONE
HEAD OF THIGH BONE
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CHART 2.

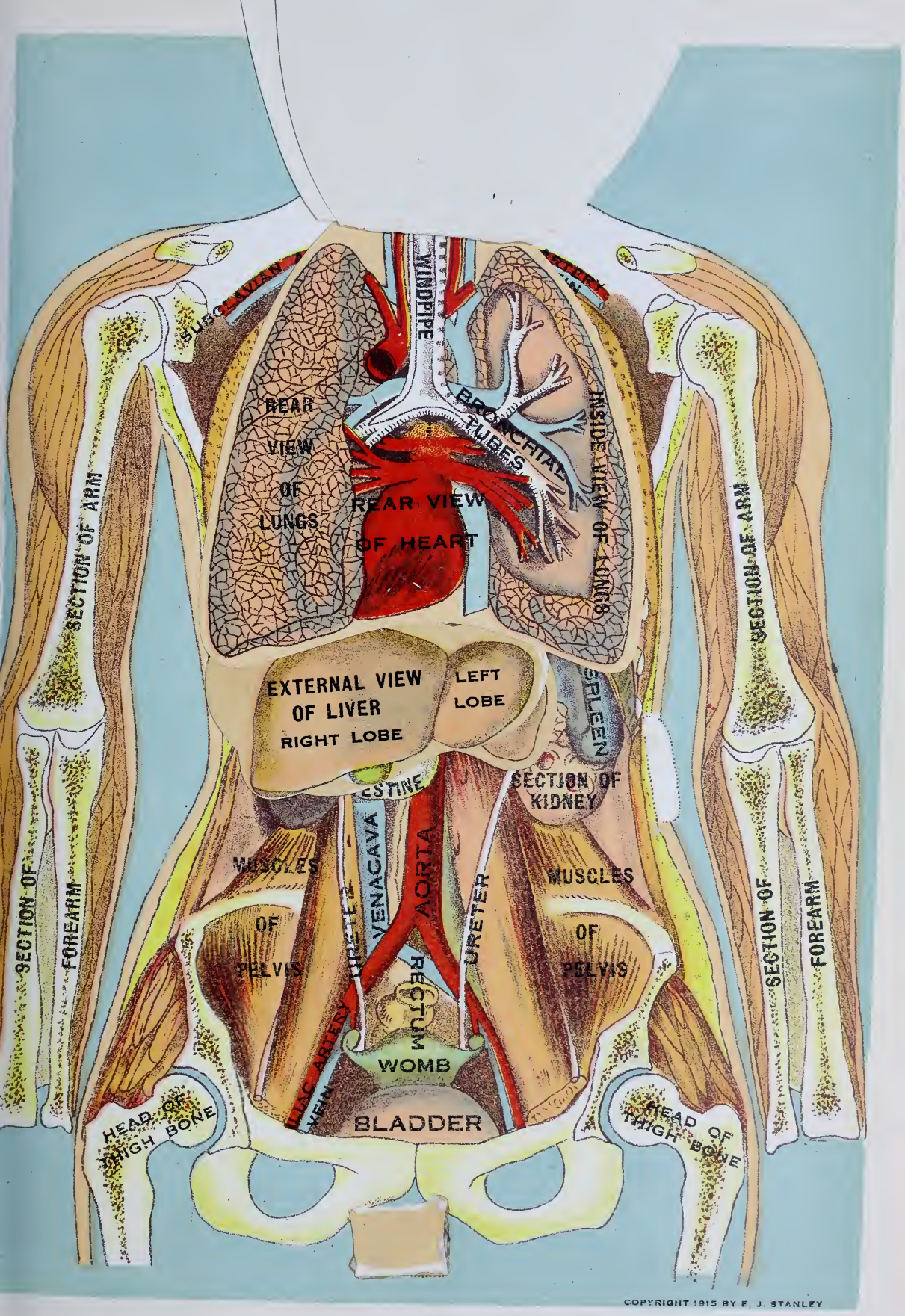
WINDPIPE
BRONCHIAL TUBES
REAR VIEW OF LUNGS
REAR VIEW OF HEART
INSIDE VIEW OF LUNGS
SECTION OF ARM
SECTION OF ARM
EXTERNAL VIEW OF LIVER
RIGHT LOBE
LEFT LOBE
SPLEEN
SECTION OF KIDNEY
MUSCLES OF PELVIS
MUSCLES OF PELVIS
VENACAVA
AORTA
URETER
URETER
RECTUM
WOMB
BLADDER
ILIAC ARTERY
VEIN
HEAD OF THIGH BONE
HEAD OF THIGH BONE
SECTION OF FOREARM
SECTION OF FOREARM
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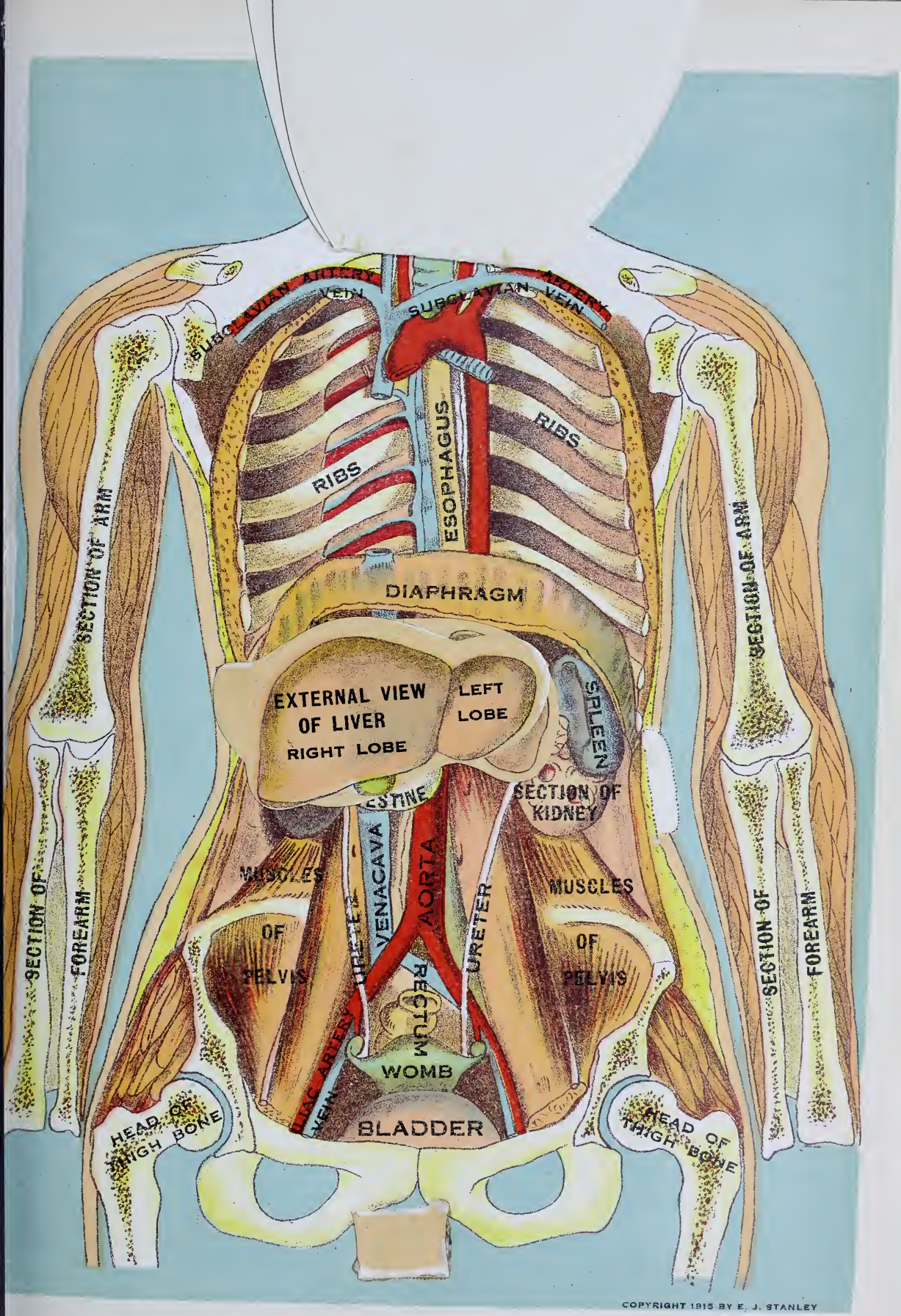
CHART 2.



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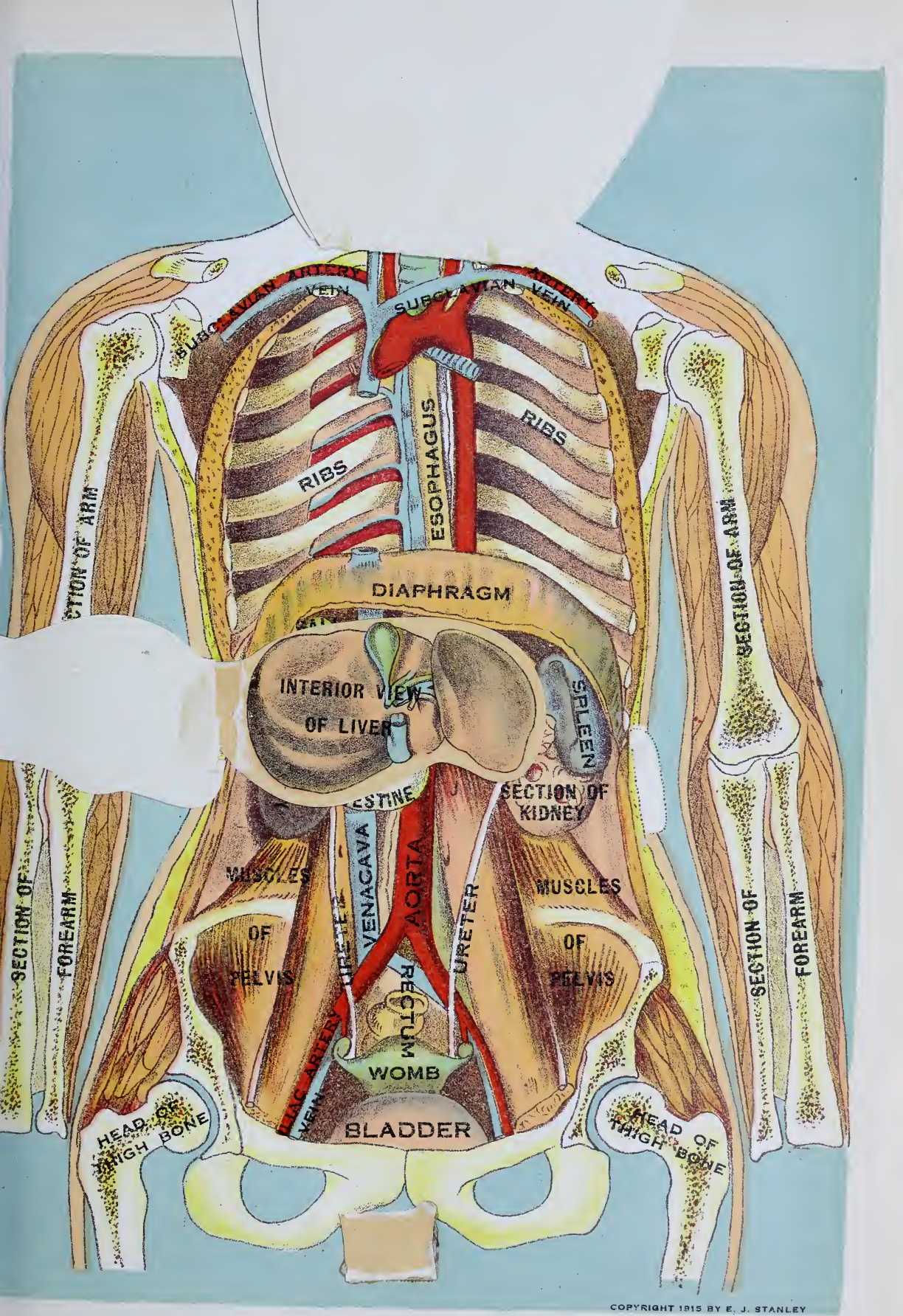

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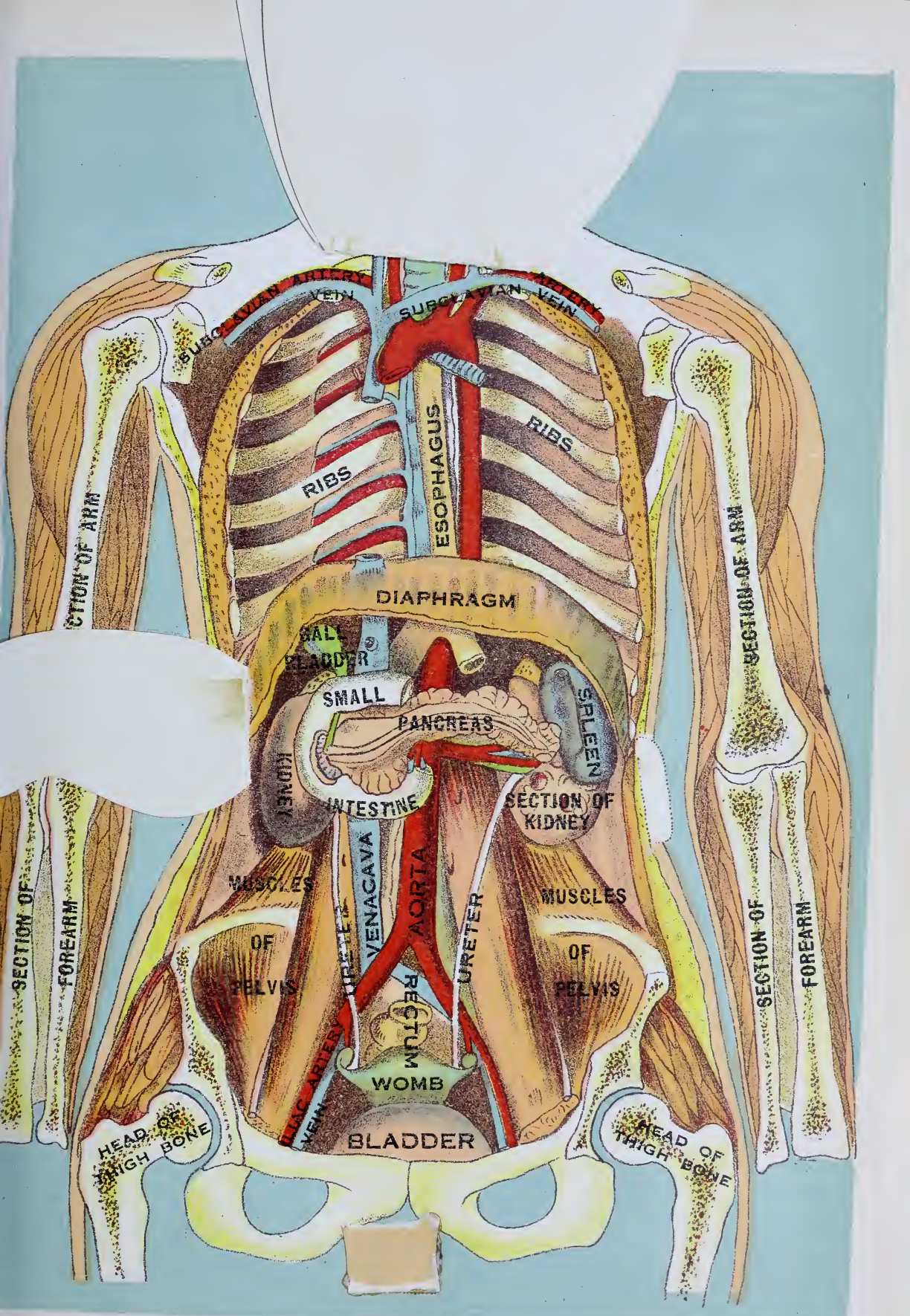

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CHART 2.

Indeed, the mechanism, the skill and the workmanship displayed in the human body is simply perfection itself. In conception, it is divine; in design, perfect; in architecture, grand; in construction, wonderful; in beauty, lovely; in form, symmetrical; in outline, sublime; in strength, great; in arrangements, marvelous; in mobility, transcendant; in adaptability, unexcelled; in fine, when studied in all its parts and their relationship to each other, we are led to exclaim with the Psalmist David, that the human body is "fearfully and wonderfully made."

Man the Most Complete Body.—The all-wise Creator, when He first made man, made him perfect. He formed every organ of the body with direct reference to the function to be performed. Every bone, muscle, nerve, organ and tissue formed in the construction of this wondrous organism is made of the right kind of material; is of the proper form and size; placed in the right position to subserve best the purpose for which they were individually and collectively designed, and to perform the peculiar duties assigned to each. We cannot talk with the ears, smell with the eyes, see with the nose, nor walk with the tongue. We cannot think with the lungs, nor breathe with the brain. The stomach was not designed to propel the blood over the system, nor the heart to digest food.

The Complete Organs and Structures.—The muscles which give form and shape to the body would be powerless instruments of movement if devoid of the bones of the skeleton. Thus we see that every organ and structure was formed with direct reference to the accomplishment of a certain definite object. Hence, the bones form a frame work, to protect the delicate organs of mind, respiration, circulation, digestion and excretion, to serve as levers on which the muscles may act to produce motion, and to preserve the form and shape of the body; the muscles, such as we observe in this plate, give form, shape and symmetrical proportions to the body, and produce its varied motions; by means of the brain we think, feel and act; the nerves of the eye take cognizance of external objects, and convey their impressions to the brain; the auditory nerve distinguishes sounds; the olfactory nerve identifies and separates the different odors brought into contact with it, and the sentient nerves of the skin are fully impressed with the touch of external objects, carry the impression of their character and size to the brain, and the motor nerves carry the commands of the will to the muscular system, that the behests of the mind may be obeyed and carried out; the heart receives the impure blood from all parts of the body, and sends it to the lungs to be purified, then receives it back again and forces it with enormous power even unto the most remote and minute part of the system; the arteries and veins are

made for the express purpose of conveying the "pabulum of life" from the heart, and to carry the vitiated and poisonous fluid to the heart; the lungs throw off the carbonic acid in the venous blood and replace it by oxygen; the stomach, by and with the aid of the salivary, biliary, pancreatic and intestinal juices, digests the food and transforms it into blood; the kidneys are designed as filters, to aid in the purification of the blood; thus we observe that the various tissues and organs of the body have each their own especial use in the human economy, and their exact and definite function to perform; and as a result of the sum total of the proper required performance of all these different functions, we have not only harmony and health, but happiness of mind, soul and body as well.

MUSCLES OF THE TRUNK OF THE HUMAN BODY.

Muscular Arrangement and Blood Supply.—In this exquisite and magnificent colored engraving we have a grand view of the wonderful arrangement of the muscles of the trunk of the human body, together with the muscular arrangement of the arms and likewise their blood supply. The trunk of the body is divided into two compartments—the thorax and abdomen.

The Thorax.—The thorax derives its name from the Greek word *thoreo,* and signifies "I leap," because the heart leaps in it. It is covered on the front part by large muscles; the pectoralis major, or large muscle of the breast, is observed on the left side of the chest, whilst on the right it is removed and exposes the pectoralis minor, or small muscle of the breast. The dove-tailed muscle observed on each side is the serratus magnus, and is employed in expanding and contracting the chest in the act of breathing. The muscles of the chest walls, in a deep inspiration, exert a force equal to lifting a weight of 750 pounds.

Walls of the Abdomen.—The muscular walls of the abdomen are nicely arranged and beautifully adapted to the functions they perform. On the left side we see the large oblique muscle, so named because of the direction its fibres run, and on the right side we observe the rectus muscle, the transverse muscle and internal oblique muscle, all of which are strong, broad muscles, whilst the manner in which they are so scientifically arranged gives additional strength to the abdominal walls, without deteriorating from its great mobility, and at the same time avoiding all pressure of the organs contained within this large cavity. There are ninety-one muscles on each side of the trunk, or one hundred and eighty-two in all, ninety of which are pairs, and two are single.

Muscles of the Shoulder.—The large triangular muscle of the shoulder —the deltoid—is one of great strength, as in fact are all the muscles of the arm. If you grasp the arm tightly just above the elbow-joint, and then bend the fore-arm, you will feel the biceps muscle of the arm become firm, hard and prominent; now straighten it again and it becomes relaxed, whilst the muscles on the back of the arm become hard and prominent. The muscles of the fore-arm are the flexors and pronators; that is, they flex the arm and turn the palm downward. In each upper extremity or arm there are fifty-three muscles, and we observe here the nicest and most economical method of packing away the muscles that could be improvised, securing strength, giving elegance to its form and shape and facilitating its mobility.

Blood Supply of Arm.—On the right arm we obtain a glimpse of the blood supply of the arm; we see the brachial artery giving off numerous branches, and observe the radial and ulnar arteries doing the same thing; thus securing ample nourishment to preserve the health, strength and beauty of the arm.

BONES OF THE TRUNK AND ARMS.

Different Forms of Bones.—On turning over this flap we are brought face to face with a grim looking but useful object—the frame work of the trunk and arms. The skeleton is of a ghastly appearance and emblematic of death; its unsightly look sends a thrill of horror through us, and we instinctively recoil from it. Yet it subserves a useful purpose in the human body, and the ugly looking bones, when carefully examined, abound in nice contrivances and ingenious workmanship; whilst each individual bone is designed for the especial duty it has to perform. Hence the bones differ in form; some are long, as in the arms and legs; some are short and thick, giving strength and compactness, as in the lumbar portion of the spine; some are flat, for covering a cavity, as the skull and pelvis, and others used for a special purpose are irregular, as in the hands and feet.

Combined Lightness and Strength.—But notwithstanding this diversity in form, the general plan constantly kept in view by the Divine Architect has been the central idea of combining lightness with the greatest possible degree of strength. The bones of the arms and legs are round, or triangular, and hollow, thus giving with the same weight a greater degree of strength than if solid, besides affording a larger surface for the attachment of muscles.

Composition of the Chest.—The chest is composed of bones, cartilages and ligaments. Its natural form is that of a cone diminishing upward; and it affords lodgment for the heart, lungs and large blood-vessels. Its walls are formed posteriorly by the seven dorsal bones of the spinal column, and the ribs as far as the angle, the sides by the body of the ribs, and front by the ribs, the costal cartilages and the breast bone.

The Ribs.—The ribs are twenty-four in number, arranged in pairs, twelve on each side of the chest. At the back they are fastened to the spine, and in front the seven upper pairs are tied by cartilages to the breast bone, three are fastened to each other and the cartilage above, and two, the floating ribs, are loose. The long, slender ribs give lightness; their arched form confers strength, and the cartilages impart elasticity; thus the three most essential pre-requisites of the chest for the protection of the delicate organs contained within this cavity are secured, whilst the freest motion in respiration is ensured.

The Pelvis.—The pelvis is an irregular-shaped basin, formed by the hip bones and the pubic bones in front. In the upper and back part is the foot of the spinal column, consisting of a wedge-shaped bone called the sacrum. It is observed firmly planted between the wide spreading hip bones of the pelvis, like the keystone of an arch, and gives a strong support to the burden above.

The Spinal Column.—The spinal column, the lumbar portion of which is here seen, consists of twenty-four bones, between which are placed pads of cartilage. Such is the elasticity of these cushions of cartilage, that, though they become condensed through the day, making us shorter in the evening than in the morning, they resume their normal thickness while we are lying in bed at night. The perfection in the architecture of the spine surpasses belief; its various uses seem a bundle of contradictions.

Bones of the Spinal Column.—The twenty-four bones of which it consists are so stiffly locked together as to form a chain that will bear and support the heaviest of burdens, yet so flexible that it will bend like India rubber; within this wondrous column hides a delicate nerve that would thrill at the gentlest touch, yet so securely does it rest in its bony couch that it feels not the slightest jar or shock; and resting upon this remarkable pillar of bones is borne the brain, without a tremor or a fear of danger; to it are found clinging the vital organs of the chest and abdomen, secure in the protection it affords.

The Shoulder Joint.—The shoulder joint, formed as it is by the shoulder-blade (scapula), collar bone (clavicle), and the arm bone, is most

beautifully designed and executed. It comprises a shallow ball and socket-joint, thus affording the freest rotary movements. The shallowness of the socket, however, accounts for the frequent dislocations of this joint; but that is compensated for by the easy, graceful carriage and swing of the arm, which a deeper socket would not permit.

The Collar Bone.—The collar bone is fastened at one end to the breast bone and first rib, and at the other end to the shoulder blade. It thus holds the shoulder-joint out from the chest, aids in protecting the important vessels of the axilla, and gives the arm a greater range of freedom, mobility and play.

THE LUNGS; THEIR MECHANISM AND WONDERS.

What the Lungs Are.—The lungs! Dense looking objects, and yet how light and buoyant! This beautiful anatomical chart shows us a front view of the chest and lungs, with the lungs enclosed within the bony basket-work of the chest. The lungs are two large, conical bodies, placed one on each side of the chest, and occupy the greater part of its cavity. During life they accurately adapt themselves to the varying dimensions of the chest; for, unhappily, the foibles of fashion very frequently cause restriction of the lungs, by interfering with the resistance and freedom of movement of the ribs, so essential to health, by tight lacing and the barbarous usage of corsets.

Pleura of the Lungs.—In this chart we see also the pleura or the investing membrane of the lungs, and right below it the diaphragm or midriff.

Two Distinct Lungs.—Although the lungs are two in number, as far as their structure is concerned, and are perfectly distinct from each other, having, as we observe in the chart underneath this one, the heart and blood-vessels between them, yet as regards their functions they may be considered the same, since they receive their blood from a single vessel, the pulmonary artery, and the air by one canal, the trachea or wind-pipe, and act in common with each other.

Size and Shape of Lungs.—As will be observed, the lungs are not quite the same size or shape; the right lung, although somewhat shorter and thicker than the left, is the larger and stronger, being divided into three lobes; whilst the left is the smaller and weaker, divided into two lobes only, and hence more frequently subject to disease.

Weight and Shape of Lungs.—The weight of the lungs varies very much; but in general they average about forty-two ounces in the male;

thirty-six in the female; the right lung being about two ounces heavier than the left. Each lung is conical in shape, with a broad concave base resting on the convex surface of the midriff, the apex directed upward and extending into the root of the neck about one inch above the level of the first rib.

Interior Arrangement of Lungs.—On turning this flap over we find a vertical section of the lungs, showing their interior arrangements. The lower end of the trachea divides, one portion going to each lung. These again subdivide and continue to subdivide in geometrical order, growing smaller and smaller with each division, and extending to every part of the lungs, finally terminating in a cluster of air cells, bound together by cellular tissue and forming a lobule. These lobules vary in size accordingly as they are located on the surface of the lung or deeper in its tissues. Each lobule is separate and distinct from the other, and forms in itself a perfect and independent lung in miniature.

Function of the Lobules.—In this arrangement we see the boundless wisdom of the Creator displayed, for were it not for this wise and perfect provision—one of the very greatest importance in the process of respiration, since it enables each individual lobule to perform its functions independently of the rest—tubercular disease, bronchitis and inflammation of the lungs would not only be incurable, but would prove to be very rapidly fatal.

Lung Air Cells.—Each air cell varies in size from the seventieth to the one two-hundredth part of an inch in diameter. The number of air cells in the two lungs is truly surprising, there being certainly not less than 600,000,000, though according to Dr. Addison's computation there are 1,700,000,000, equivalent to 1,500 square feet of surface on which the process of purifying the blood is constantly and continuously going on in a healthy lung.

Blood-vessels.—On the next flap we have a graphic illustration of the internal arrangements of the blood-vessels of the lungs and bronchial tubes. The pulmonary artery, arising from the right ventricle of the heart, conveys the venous blood to the lungs. It penetrates the lungs and divides and subdivides into branches, which accompany the bronchial tubes and terminate in a dense capillary net-work upon the walls of the air cells, where the blood undergoes that magical change, giving up its poisonous qualities and becoming revivified and healthful.

Pulmonary Veins.—From this net-work of arteries and air cells the radicles of the pulmonary veins arise, and, coalescing into larger and larger branches, at length accompany the arteries and return the blood to

the left auricle of the heart in a purified condition. The pulmonary arteries and veins differ from the same vessels in other parts of the body, since the former conveys venous blood, and the latter arterial blood.

Breathing.—Respiration, or the act of breathing, consists of the alternate inspiration and expiration of air to and from the lungs; in the process of which the lungs themselves are almost passive instruments, since their contraction and expansion takes place by means of the muscles which surround the chest. The diaphragm or midriff, which, when at rest and the lungs empty, forms a beautiful dome to the abdominal cavity, becomes depressed during the inspiratory process, and presses the walls of the abdomen outward. At the same time the ribs become elevated, thus increasing the size of the chest. Thereupon the elastic lungs expand to occupy the entire space, whilst the current of air, in obedience to a well-known physical law, rushes down the wind-pipe and enters the numerous air-cells, the result of which is *in*spiration. In expiration the reverse of this takes place. We bend forward, draw the abdominal walls inward, press the diaphragm upward, whilst the ribs are pulled downward. All these acts simultaneously performed decrease the size of the chest, and force or expel the air from the lungs.

Breathing Capacity of Lungs.—The breathing capacity of the lungs bears a close correspondence to the stature of man. For an ordinary-sized man of about five feet eight inches in height, it will be 230 cubic inches, or about one gallon of air, and for each additional inch in stature up to six feet, there will be an increase of eight cubic inches. In a forcible expiration all the air in the lungs is not expelled; there still remains behind 100 cubic inches. Thus, with this unexpelled air, the breathing capacity of an ordinary-sized man is about 330 cubic inches, or equivalent to 11 pints of air. Of the 230 cubic inches, 100 can only be forced into the lungs by the exercise of great effort, and is available for emergencies, as striking a heavy blow, or for the purpose of training, as in singing, rowing, running, climbing, etc.; but the extra amount of air always on hand in the lungs is of great value, since it enables the lungs to perform their functions continuously, even under severe and violent exertions.

Giving Up of Oxygen.—The atmospheric air laden with its life-sustaining property, oxygen, having passed into the lungs, gives up that vital element and receives in its place the carbonic acid gas, water, and other refuse materials which the blood has picked up in its journey through the body, and which are no longer fitted to circulate in the blood and preserve the vitality of the body. No tonic invigorates so well as a few, deep, full inspirations of pure, cold air.

Circuit of the Blood.—The blood thus purified passes back to the heart to go on its circuit through the body, every organ of which renews its energy and vigor from the magician's fiery wand, pure, healthy blood; while the air exhaled carries off the impurities.

Change in Color of the Blood.—During this process the blood changes from a dark purple to a bright red. Pure air is the cheapest necessity and the greatest luxury of life. Let it not be the rarest. The relative proportion of the respirations to the pulsations of the heart is about 1 to $4\frac{1}{2}$ or 5; and the quantity of air required to keep the blood pure is very great. Indeed, respiration is the falling weight, the bent spring, which keeps the clock of life in motion; the inspirations and expirations are the strokes of the pendulum which regulate it.

Delicacy of the Organs.—The perfection of the organs which carry on this stupendous office challenges our warmest admiration. So delicately are they arranged that the slightest pressure will cause intense pain, yet tons of air surge to and fro through their intricate passages, and bathe their innumerable cells without our knowledge, so to speak, of its coming and going. We annually perform over 8,400,000 acts of breathing, inhale over 150,000 feet of air, and purify nearly 4,000 tons of blood! This gigantic and unburdensome process goes on constantly, never wearying or worrying us when in robust health, and we are struck dumfounded with amazement when the cold calculations of science reveal to us its magnitude and marvelousness.

Second Use of Breathing.—Nor is this stupendousness all. Nature dislikes a waste of energy. In addition to and by a wise adaptation and economy, the process of respiration is made to subserve a second use no less important than that of purifying the blood—the power of speech. The exhaled air, laden though it may be with the human detritus and off-scourings of the body, in passing through the vocal organs can be transformed into prayers of faith, songs of hope and words of good cheer, kindly encouragement and expressions of love!

THE HEART AND ITS WONDERS.

What the Blood Is.—The blood—the pabulum of life—has not inaptly been termed "Liquid Flesh." But it is more than that, since it contains the materials so essential and so requisite for the building up and repair of every organ and tissue of which the body is composed. The blood is the liquid by means of which the circulation in the body is carried on; it permeates every nook and corner of the system, and is com-

posed of a thin, colorless fluid, the *plasma,* filled with red disks, so small, flat and thin that it requires 3,500, placed side by side, to measure one inch, and no less than 18,000, placed one upon the other, to make a column one inch in height. These disks are continually forming and as constantly dying.

Coagulation of the Blood.—According to Dr. Draper, of New York, 20,000,000 die at a single breath! Blood when exposed to the air coagulates, and the value of this peculiar yet intrinsic property cannot be overestimated. When an artery is ruptured bleeding takes place, the blood coagulates and forms a plug, thus preventing further hemorrhage. Thus we observe with what Divine foresight and wisdom, not only the wants of the body are provided for, but also the accidents to which it is liable.

Size, Shape and Location of the Heart.—In this beautiful anatomical chart we obtain an accurate idea of the relative size, shape and position of that wonderful engine, the heart, whose tireless efforts to keep the wheels of life in motion are truly surprising, and fill us with amazement at the prodigious work it daily performs. The heart is an irregular, pear-shaped, hollow, muscular organ, placed obliquely in the lower and front part of the chest, between the two lungs and inclining to the left of the centre. The base is directed toward the spine and corresponds with the fourth and fifth dorsal spinal bone, while the apex points between the cartilages of the fifth and sixth ribs on the left side. In this illustration the pericardium, or loose sac in which the heart is enclosed, is removed, and we see the coronary artery with its branches distributed over the outer surface of the complex and restless organ.

Heart a Double Organ.—On looking at the heart one would think it was a single, solid organ. It is not, however, but a double organ, divided into four compartments; the two upper ones, from their supposed resemblance to a dog's ear, are called auricles, and the lower ones, from resembling a little stomach, are called ventricles. The auricle and ventricle on each side communicate with one another, but the right and left halves of the heart are each separate and distinct organs, and perform different functions—the right side propels the dark, vitiated and impure blood, whilst the left deals with the bright crimson, life-giving and life-sustaining blood.

Use of the Auricles.—The auricles serve as reservoirs to receive the blood—the right, as it comes dark and foul from its tour of the body; the left, as it filters bright and pure from the oxygenated forest of the lungs—and to furnish it to the ventricles as they need it. This is graphically shown on the chart, the large blue vein, formed by the jugular and

subclavian veins, is seen descending downward and emptying into the right auricle; the red pulmonary vein, formed by the coalescing of its numerous branches, conveying rich, pure blood from the lungs and depositing it in the left auricle. Corresponding to the lightness of the work they perform, the walls of the auricles are comparatively thin and weak.

Ventricles of the Heart.—The walls of the left ventricle, which propels the blood to the remotest corners of the human frame, are correspondingly thicker and stronger than those of the right, which forces the blood to the lungs only. Arising from the right ventricle is seen the blue pulmonary artery, conveying its foul, poisonous, vitiated and venous stream to the lungs, while from the left ventricle is observed the large main artery of the circulatory system—the aorta—from the arch of which arise the right and left carotid arteries.

Changes in the Human Body.—The human body is in a constant state of change. In the midst of life there is death. The blood disks die and new ones are born into life. Every act of life is destructive as well as constructive. Not a thought can be evolved but numerous brain cells die; not a wink of the eye, a smell of a lovely rose, nor a muscular movement, but results in the death of some part of the machinery involved. Every process of life is a process of death. The scales of the epidermis are constantly falling off and being replaced by fresh cells from beneath, and it is on the continuance of this interchange that our life, health and vigor depends. The more rapidly this change goes on, and fresh, vigorous, healthy tissues take the place of the old lifeless ones, the more elasticity, buoyancy and strength we possess—the more healthy and robust we become.

Work of the Heart.—No slave ever performed his work more patiently than the heart. Its quivering task is essential to life and health. It is the fountain from whence the spirit flows, and on the faithful performance of its functions every party of the body depends for the warm stream of life, motion and vigor which it unstintingly furnishes. The ancients believed the heart to be the seat of love. Within its walls were located all that was pure, true, good and noble, as well as the evil passions of the soul. And although modern science has found the seat of mind, reason, consciousness and the mental powers to be located in the brain, and thus robbed the heart of its romance, yet it has revealed wonders connected with this small organ, that certainly eclipse the mysteries associated with it in the past. Pit-a-pat! pit-a-pat! throbs this marvelous engine, and in response to its constant throbbing the blood bounds along the myriad of tubes, conveying messages of life and health.

Constancy of Heart Work.—Our mind cannot stop its beatings; it cannot stop itself; sleep does not interfere with its workings, and our daily labor only strengthens its force and regularity. This wonderful organ throbs on night and day, week in and week out, the year round, with ceaseless, tireless energy. It beats at the rate of 100,000 strokes per day, 40,000,000 per year, and not unfrequently, 2,800,000,000 without a single stoppage. It is the most powerful engine known to science. Its daily work is equal to one-third of that of all the muscles of the body. If it should expend its entire force in lifting its own weight vertically, it would rise 20,000 feet in an hour. The greatest exploit ever accomplished by a locomotive was to lift itself through less than one-eighth of that distance. Vast and constant as is this perpetual throbbing, so perfect is the machinery with which it is carried on, that there are those who do not even know where the heart lies until disease or accident reveal its location.

Vitality of the Heart.—Its vitality is as amazing as its strength. While life exists this tireless organ never stops. In disease, as long as a flutter of this wondrous organ exists, we know the spark of life has not altogether vanished, and new hope is begotten that health may be restored. During such long lives as we sometimes see, the heart has propelled no less than 500,000 tons of blood; and yet, during all this patient, unfaltering and unflinching labor, it has repaired itself as the waste has occurred.

Heart Rhythms.—The rhythm of its beats never fails until death breaks into the casket and seizes the ever throbbing pendulum at the command of the great Master Workman, silencing the quivering muscles of the heart and compelling the wheels of life to stand still.

THE DIGESTIVE APPARATUS AND ITS WONDERS.

Value of the Plates.—Seeing is believing; nay, it is more, it is knowing and remembering. The mere reading of a statement on any particular subject does not always advance our knowledge of the matter in question. The observation of a fact, or its proper illustration by appropriate diagrams, such as we observe these anatomical charts to be, not only emphasizes the point considered, but aids us in remembering the principal features connected with the functions performed, thus advancing our knowledge of the subject discussed, and educational progress is made.

Quantity and Variety of Foods.—As we have already seen, the human body consists of numerous mechanics or artisans, who are constantly at work repairing and upbuilding the unceasing destruction that is contin-

ually going on. If fresh food be not daily supplied, this work would soon cease, and the lamp of life flicker out. To replace this constant waste we require nearly three pounds of solid food, and fully three pounds of liquid food for our daily allowance. But to convert the pent-up energies of bread, meat and vegetables into the tissues of our own mechanism requires a number of differently constructed organs, and these we now desire to draw your attention to in this beautiful chart. The organs consist of the stomach, liver, pancreas and intestines, which comprise the principal organs concerned in the process of digestion.

The Stomach.—The stomach is an irregular expansion of the gullet or œsophagus, and is the receptacle which receives the food when swallowed. Its shape has been, not inaptly, likened to the Scotch bagpipe. It will hold about three pints, though it is capable of considerable distension. When moderately filled with food it measures about twelve inches in length by four inches in diameter at its widest end. The walls of the stomach consist of four distinct coats, held together by fine areolar tissue, and are arranged in the following order, from within outward: the mucous, the areolar, the muscular and the serous. The inner mucous coat is a smooth, soft, rather thick, pulpy membrane, loosely connected with the muscular coat, and secretes the gastric digestive fluid of the stomach.

Fine View of Stomach Coatings.—On turning over the flap we obtain a very fine view of this remarkable membrane. The areolar coat is placed between the muscular and mucous coats, and connects with both. The muscular coat is very thick and stout, and composed of three sets of fibres, the longitudinal, circular and oblique, which form three distinct layers. The outer coat is a thin, smooth, transparent and elastic membrane, derived from the peritoneum, and well lubricated to prevent friction. When the fibres of the muscular wall contract, a peculiar churning movement of the stomach is produced, thus securing the thorough mixing of its contents, that every particle may come into contact with the solvent properties of the gastric juice.

The Pyloric Gate.—At the smaller end the muscular fibres contract and form a gateway—the pylorus, as it is called—which carefully guards the exit from the stomach, and allows no food to escape until properly prepared. The gastric blood-vessels are seen distributing themselves over the outer surface of the organ, thus ensuring its nutrition and repair.

The Liver.—The liver is the secreting organ by which the bile is formed. It is situated on the right side below the diaphragm, and is of a reddish-brown color. It is irregular in form, being convex on the upper

surface, irregularly concave behind, very thin in front, and weighs about four pounds. It is, therefore, seen to be the largest organ or gland in the body. It is divided into two lobes, the right and the left, the former being by far the larger. On turning the flap over, we see how intricately it is arranged internally.

Blood-vessels of the Liver.—The blood-vessels of the liver are the hepatic artery and veins, and the portal vein; the lymphatic vessels are numerous, and the nerves are supplied from the pneumogastric, the phrenic and the hepatic plexus. The liver, therefore, receives two kinds of blood: the arterial, by means of the hepatic artery, and the venous, from the portal vein, from which the bile is principally formed. The bile is a dark, golden fluid, of extremely bitter taste, of which three pounds is secreted daily. When not used in digestion it is stored away in the gall-bladder, a fine view of the location of which we have in this chart. The action of the bile on food, though not fully understood, is necessary for perfect digestion.

The Pancreas, or "Sweetbread."—The pancreas, or "sweetbread," is a single glandular organ, situated transversely across the upper and back part of the abdomen, on a level with the last dorsal spinal bone. It is of an irregular, elongated form, from six to eight inches in length, an inch and a half in breadth, and from a half to one inch in thickness. It secretes about seven ounces daily of a slightly alkaline fluid containing an organic principle—pancreatin, which has the property of changing the starchy food into sugar. Whilst it has this power, yet its chief work in the digestive process seems to be the breaking up of the fat globules into myriads of minute particles which mix freely with water, and thereby promote their absorption by the lacteals.

The Intestines.—The next chart shows us the manner in which the intestines are arranged in the abdominal cavity. The entire intestinal canal is about thirty feet in length, and is divided into two portions—the small intestines, and the large intestines; these again are each subdivided into three different portions. Of the large intestines, the transverse portion is laid open, showing the internal arrangements. A section of the bladder is seen on this chart.

Machinery of Digestion.—From the number and differently formed structures which constitute the digestive organs, it will be observed that that function is a very highly complex process. If the food were thrown directly into the circulating fluid, it could not be used for the purpose of nutrition. It requires for its transformation into blood, bone and muscle, a series of complex machinery, each part of which is specially designed

for the particular part it plays in this wonderful and complicated process.

Use of Mouth and Teeth.—The mechanical part, which, although not shown in this chart, may be carefully studied in the chart giving the different views of the head, is performed by the mouth and teeth, and the pulverized food is subjected to the action of the saliva. The lubricated morsel of food is now gathered into a ball and conveyed to the back of the mouth by the muscles of the cheek and tongue. On its arrival here, the soft palate lifts upward and closes the posterior nasal openings; the epiglottis shuts down over the trachea or wind-pipe, forming a bridge over which the food passes, thus preventing it from falling into the respiratory track.

Duty of the Throat.—The muscular bands of the throat now grasp it and pass it down the gullet into the stomach, beyond our control. Here it comes into contact with the gastric juice, undergoes the churning motion of the stomach, is guarded over by the pylorus, thoroughly saturated and mixed before entering into the intestinal track, where it is subjected to the action of the bile, the pancreatic juice and the intestinal fluid, each with its special duty to perform.

Nature's Treasures Open to Man.—All this is a very complicated and diversified process, the necessity for which can only be explained upon the hypothesis that Nature, in her exhaustless munificence, has opened her proud domains, and poured forth to man the treasures of every land and every sea for food; the cornfields wave their golden grain for him; the wheat, rye, oats, corn, maize, rice, each different, yet highly nutritious and sufficing; the palm, the date, the banana, the fig, the pineapple, spread out a delicious harvest on the air; the luscious apple, pear, peach, plum, cherry, tempt his ready hand; the potato, the beet, the turnip, the tomato, the cabbage, the pea, the cauliflower, and a thousand other good things, incite his appetite, whilst to this feast is added the flesh of birds, of oxen, of sheep, of swine and of fish; that before the waving wheat and corn, the flesh of other animals, the fruits and farinaceous foods, the running water, the luscious oyster and fish, etc., can be transformed into the refined and spiritual organization of man, it must be thoroughly prepared by the several steps in the digestive process—then, and only then, is it permitted to enter into and commingle with the highly complex, nutritious and life-sustaining fluid, the blood.

Great Value and Beauty of the Plate.—We can understand much of this wonderful process. We have looked into the stomach, watched its peculiar actions and traced its various steps, from which the scientist is

capable, in his laboratory of knives, mortars, baths, chemicals and filters, of imitating many of the operations of digestion; but just at the moment he thinks himself most successful, he is compelled to pause. At the threshold of that "one step more," which Fontenelle required, "and he would surprise nature herself," he stops, and very wisely, without concealment of his designs, admires, then wonders, and finally worships with all the reverence of his soul.

Transformation of Food Into Flesh.—How strange this is—the transformation of food into human flesh, into human thoughts! We eat a meal; it is composed of meat, bread, vegetables and liquids. The more solid part is ground by the teeth, mixed with the different juices, dissolved, changed, organized and is swept through the body in the circulation of the blood. Each organ seizes its own particular food as it passes. Within the cells of the various tissues it is transformed into the soft, sensitive brain, or the hard, callous bone; here into the nerve of sight, there into gristle or tendon; here briny tears are formed, there the bland saliva; in the stomach, acid juice; in the skin, acrid perspiration; bile for digestion, oil for the hair, nails for the fingers, muscle for the strong arm of toil, and flesh and fat to give shape, form and beauty to the face.

Wonderful It All Is.—Wonderful! Within us is an Almighty Architect, who superintends a thousand skilled laborers, that make a way which puzzles human comprehension; here a fibre of muscle; there a filament of nerve; here constructing a bone; there uniting a tendon—fashioning each with the most scrupulous care and unerring nicety. Without the buzz of a saw, or the sound of a hammer; without the slightest compression, or the least particle of noise; with a regularity, certainty and exactness, the glorious temple of man, in the image of his Creator, goes up and up, day by day, skilfully put together by these noiseless, tireless and expert workmen.

THE VERMIFORM APPENDIX.

The chart brings into view the location and form of that wonderful little organ known as the Vermiform (wormlike) Appendix (appendage). It is an appendage of the Cæcum, or lower bowel. Its uses as a bowel appendage have never been established. It occurs in other animals besides man. Notwithstanding its diminutive size and uselessness as an organ it is the seat of that most painful and dangerous disease called Appendicitis, which was formerly attributed to the presence of some foreign body, as a grape-seed, lodged within. But it has been found inflammation of the Appendage may arise from numerous other causes.

Many doctors insist that a surgical operation—that is, the entire removal of it with knife—is the proper curative agent, especially in acute cases. But others insist that the knife is too frequently used, and that the disease, if taken in time, is quite surely curable by other means.

THE CLITORIS, URETHRA, VAGINA AND HYMEN.

These female organs show further the perfection which anatomical plate printing has attained.

Clitoris.—This small organ, it will be seen, is situated at the upper part of the vulva, or outside parts of the female generative system, and is usually concealed by the lips of the pudenda. It performs a function during sexual intercourse similar to that performed by the penis of the male.

Urethra.—This highly useful organ, common to both sexes, is, as will be seen by the plate, the canal, or medium, by means of which the urine is carried from the bladder to be voided. It is a delicately lined organ, furnished with retentive valves, and therefore susceptible to a variety of diseases.

Vagina.—This word implies a sheath, and is applied to the canal which leads from the uterus (womb) to the external organs of generation in the female sex. Commonly, it implies such external organs, or organ, as depicted in the plate.

Hymen.—The mucous membrane, or virginal membrane, at the entrance of the female sexual organ, or vagina.

BLADDER AND PART OF VAGINA.

The function and form of the bladder are familiarly known. It is the recipient of the kidney secretions, and contains them till voided through the urinary canal. It is of tough, elastic structure, guarded at the exit by a contractile valve, by means of which the urine can be retained until the quantity becomes excessive. The plate brings out the entire urinal tract, from the bladder to the vagina, and presents a fine and useful anatomical and physiological study.

WOMB, OVARIES AND VAGINA.

The Womb.—The plate beautifully and effectively illustrates the location and formation of the womb, that wonderful organ which performs the function of parturition, and which is so constructed as to assist in all

the necessary efforts of birth. Its structure is elastic and strong, and it expands readily to accommodate the growth of the child (fœtus). While this is true exteriorly, its inner parts are rather delicately lined, and subject to a variety of painful diseases, generally designated as "Diseases of the Womb."

The Ovaries.—The organs are situated contiguously to the womb. They signify eggs from their shape, and they are the parts which the male semen acts upon to produce the phenomenon of pregnancy. Their enlargement by inflammation and their passage down the fallopian tubes, once a month during the middle period of female life, produces the condition familiarly known as menstruation. The plate also affords another view of the vagina.

NATURAL POSITION OF CHILD AT TIME OF BIRTH.

This beautiful and effective plate shows the natural position of the child at the time of birth. It is technically called the presentment of the fœtus for birth. Of presentments there are many varieties, whose study is most interesting to the obstetrician. Some of them give rise to very difficult and dangerous delivery. When the presentment is natural, as in the figure, the comfort of the mother is increased and the doctor's anxiety is much allayed.

VIEW OF THE LARGE BLOOD-VESSELS, SPLEEN, KIDNEYS AND BLADDER.

Blood-Vessels of the Body.—The blood-vessels of the human body consist of the heart, arteries, veins and capillaries. The heart and its wonders we have already referred to. In this magnificent chart we are enabled to form some idea of the larger blood-vessels. We see the main arterial tube of the body—the aorta—from a point where it unites with the arch of the aorta; and in its descent downward along the spinal column it gives off numerous branches.

The Arteries.—Opposite the fourth lumbar vertebra it is seen to split in two, and these divisions are called, from their position, the right and left iliac arteries. These are seen to divide again into the internal and external iliac arteries, the former of which is distributed to the walls and viscera contained in the pelvis, then proceeding to the lower limbs after sending two important branches to the abdominal walls. The arch of the aorta gives off the innominate artery, which divides into the right carotid

and right subclavian arteries; the left carotid and left subclavian spring direct from the arch of the aorta. Each carotid artery divides into the external and internal carotid arteries, the former being distributed to the external parts of the face and head; the latter supplies the brain and internal parts of the cranium. The subclavian arteries supply the upper extremities with blood.

Intercostal Arteries.—The intercostal arteries and veins are beautifully illustrated in the chart. The veins return the blood to the heart. The large ascending and descending venæ cavæ are seen in this illustration.

Meaning of Artery.—From the fact that at death the arteries are empty, the ancients believed them to contain air, whence their name, derived from *aer,* air, and *terco,* I keep, which literally means, *air ducts.*

The Spleen.—The spleen is a spongy organ, of a livid color, oval in figure and situated in the left upper part of the abdomen and immediately behind the stomach. Its weight varies from four to ten ounces. It is largely composed of cells, but its function is little understood, though from its position it is believed to be in some way useful to the stomach during the process of digestion.

The Kidneys.—The kidneys are two glandular bodies, having for their functions the secretion of urine. The form of the kidney resembles a French bean; its average length being from four to four and a half inches, two inches in breadth and one in thickness. The two kidneys are situated one on each side of the spine in the lumbar region, opposite the last two dorsal and two first lumbar vertebræ; they are of a brownish-red color flattened from before backward, and grooved on the interior border for the reception of the great vessels.

The Veins.—The venal arteries are derived direct from the aorta; and the large veins terminate in the ascending large vein. On the right kidney is seen the super-renal capsule; whilst the left is cut vertically into showing the uriniferous tubes, much convoluted and inosculating with each other. The ureter is seen arising from the pelvis of the kidney, descending in an oblique manner to the bladder. These wonderful little organs appear to act as filters, and thus assist to keep the vital stream of life in as pure and as healthy a condition as possible.

The Bladder.—The bladder is a thin, membranous bag, which serves as a receiver of the urine secreted by the kidneys, and which remains there until voided by urination through the urethra.

Bone Sections.—The sections of the bones show their cancellated appearance, which combines lightness with strength.

CHART III.

WONDERS OF SIGHT, HEARING, TOUCH AND LOCOMOTION.

THE EYE AND ITS WONDERS.

Beautiful Plate of the Eye.—The beautiful flesh-colored engraving at the right-hand top corner of this exquisite composite anatomical plate gives a strikingly natural, life-size representation of the human eye, together with its external appendages, the eyebrows, the eyelids, and the lachrymal or tear glands.

Muscles of the Eye.—On turning the flap we see four of the six delicate, but withal strong muscles which not only hold the eye firmly in its bony orbit, but also move it upward toward the canopied vaults of heaven, downward to view the beauties of nature on earth; or sidewise, to the right or left, spanning half the horizon at a single glance! The next illustration gives us a graphic and faithful delineation of the beautiful arrangements of the numerous curtains, humors, lenses, pigments, membranes, nervous coats and blood-vessels which enter into the composition of this remarkable organ, each of which is exquisitely adapted to the respective functions it has to perform.

Wonders of the Eye.—The human eye is one of the most wonderful, as well as delicate, organs of the body. It is the window through which the heart, mind and soul of man shines. Sorrow or joy, grief or mirth, pain or pleasure, sunshine or shadow are reflected through this wondrous camera of light; the human passions hold their orgies in this window; truth and love dance their happy and joyous day-dreams before its luminous curtain; and through it accurate delineations of every object that comes within its range are carried to and photographed on the brain, the great art gallery of the soul! Can man, with all of his great and scientific achievements, conceive of anything in the arcana of his accomplishments more beautiful, more wonderful, or more perfect than the human eye!

THE EAR AND ITS WONDERS.

The External Ear.—The organ of hearing consists of three parts: the external ear, the middle ear or tympanum, and the internal ear or labyrinth. The external part of the ear represented in this colored engraving is very realistic of that essential appendage to this important special organ

of sense in man. It consists of an expanded sheet of cartilage, folded in true trumpet fashion, for collecting the sound waves and conveying them to the external meatus or mouth of the auditory canal.

The Ear Drum.—On the back of this flap is seen a strikingly natural representation of the middle ear, the tympanum or drum, as it is frequently called. From the bottom of the tympanum is observed the Eustachian tube, through which is conveyed air from the pharynx to the middle ear. Across this chamber is seen stretched three very tiny, singular bones, which, from their shape, are called the hammer, the anvil and the stapes. These delicate bones are connected together, one by ball and socket joint, the other by a hinge-joint and by ligaments, and are moved by small muscles; they serve to convey the wave sounds across the tympanum cavity to the internal ear.

Show of Ear Canals.—The semicircular canals, and the cochlea, so named from its resemblance to a snail's shell, are also typically shown. In the next colored illustration we observe a graphic and truthful view of the delicate internal arrangement and mechanism of the internal part of the organ of hearing. Here we observe the winding stair of the cochlea, over the surface of which the delicate fibrils of the auditory nerve expand, and the minute fibres of Corti, called from their discoverer, are seen arranged with geometrical precision, the longest at the bottom and the shortest at the top.

Wonders of the Spiral Plate.—If this curious and artistic spiral plate, which is seen to wind two and one-half times round, could be unrolled and made to stand in an upright position, it would make a beautiful microscopic harp, not of a thousand strings, but of three thousand strings, and if it were possible to strike these delicate infinitesimal cords as we can the keyboard of an organ or piano, every conceivable variety of tone that the ear can distinguish would be produced and conveyed to the brain as the product of sound.

THE HAND; ITS MECHANISM AND WONDERFUL ENDOWMENTS.

Engraving of the Hand.—To tell one that this exquisite colored engraving represents a human hand seems almost like questioning his sanity. Yet such it is; but how few there are who can give an intelligent account of the hand, describe its beautiful arrangements and complex mechanism, or tell of its wonderful endowments. Small in compass, compact in structure, yet so skilfully arranged are its blood-vessels and nerves, that they form a complete net-work over its surface. So minute are they in their

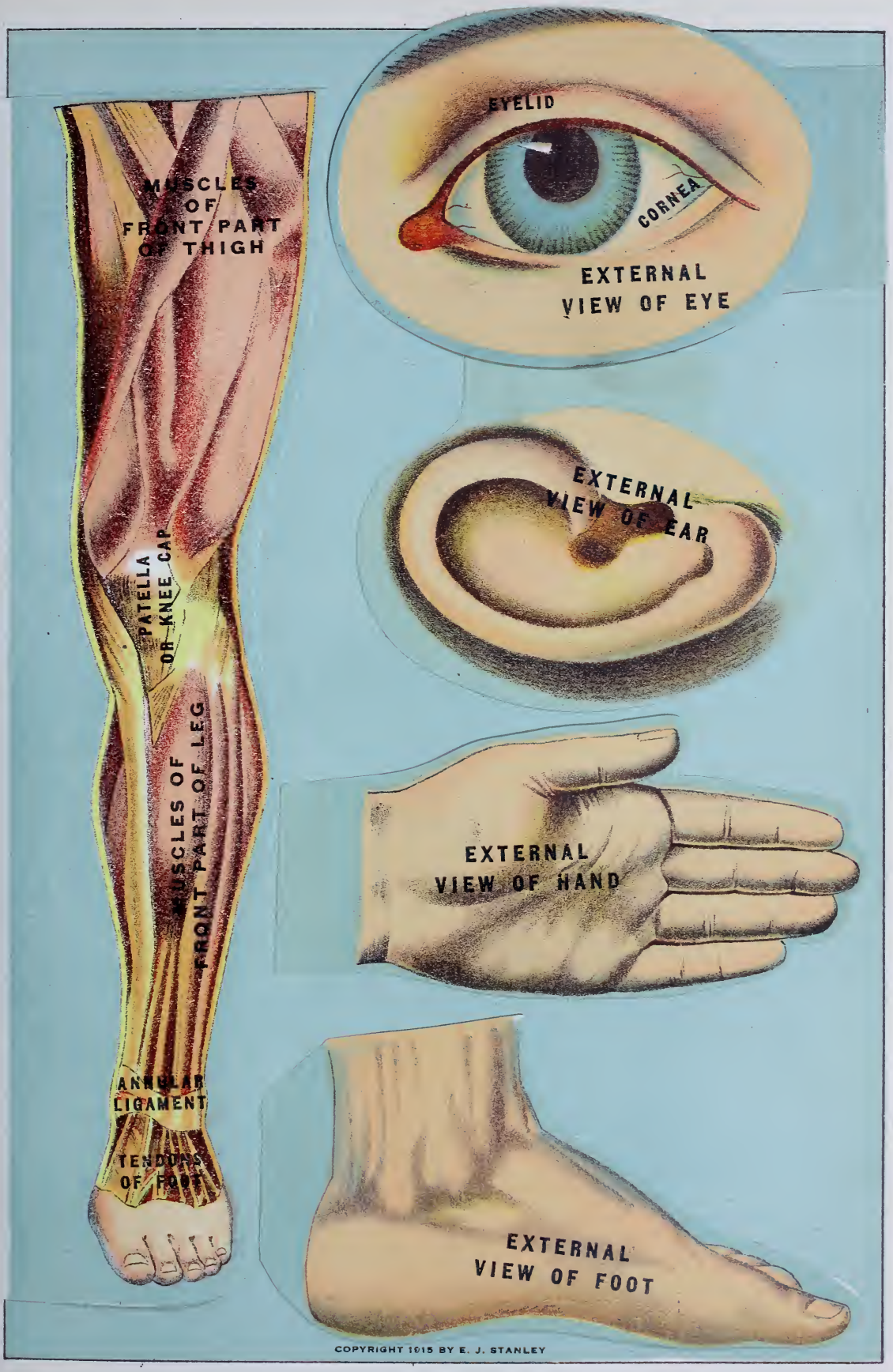
MUSCLES OF FRONT PART OF THIGH
PATELLA OR KNEE CAP
MUSCLES OF FRONT PART OF LEG
ANNULAR LIGAMENT
TENDONS OF FOOT
EYELID
CORNEA
EXTERNAL VIEW OF EYE
EXTERNAL VIEW OF EAR
EXTERNAL VIEW OF HAND
EXTERNAL VIEW OF FOOT
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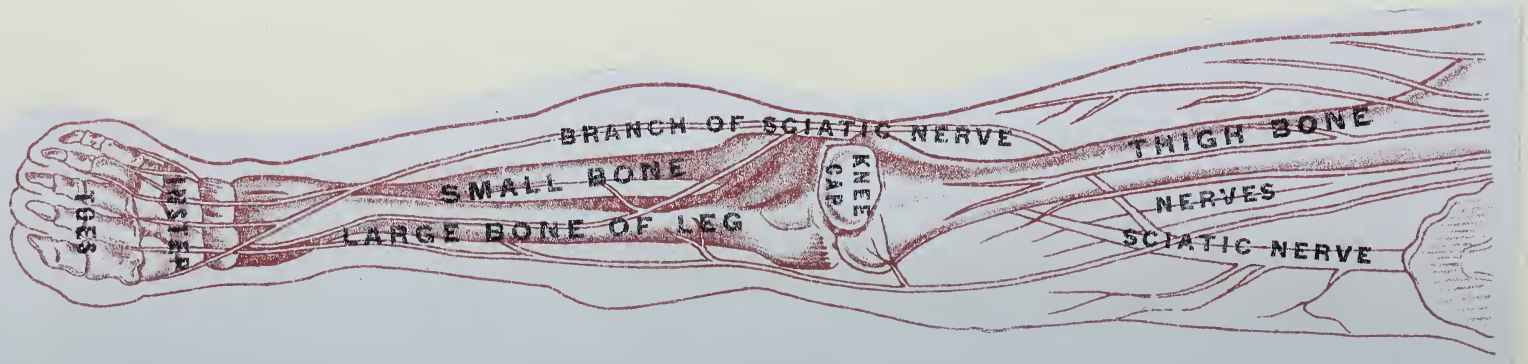
CHART 3.


BRANCH OF SCIATIC NERVE
THIGH BONE
SMALL BONE
KNEE CAP
NERVES
LARGE BONE OF LEG
SCIATIC NERVE
TENDONS
TOES

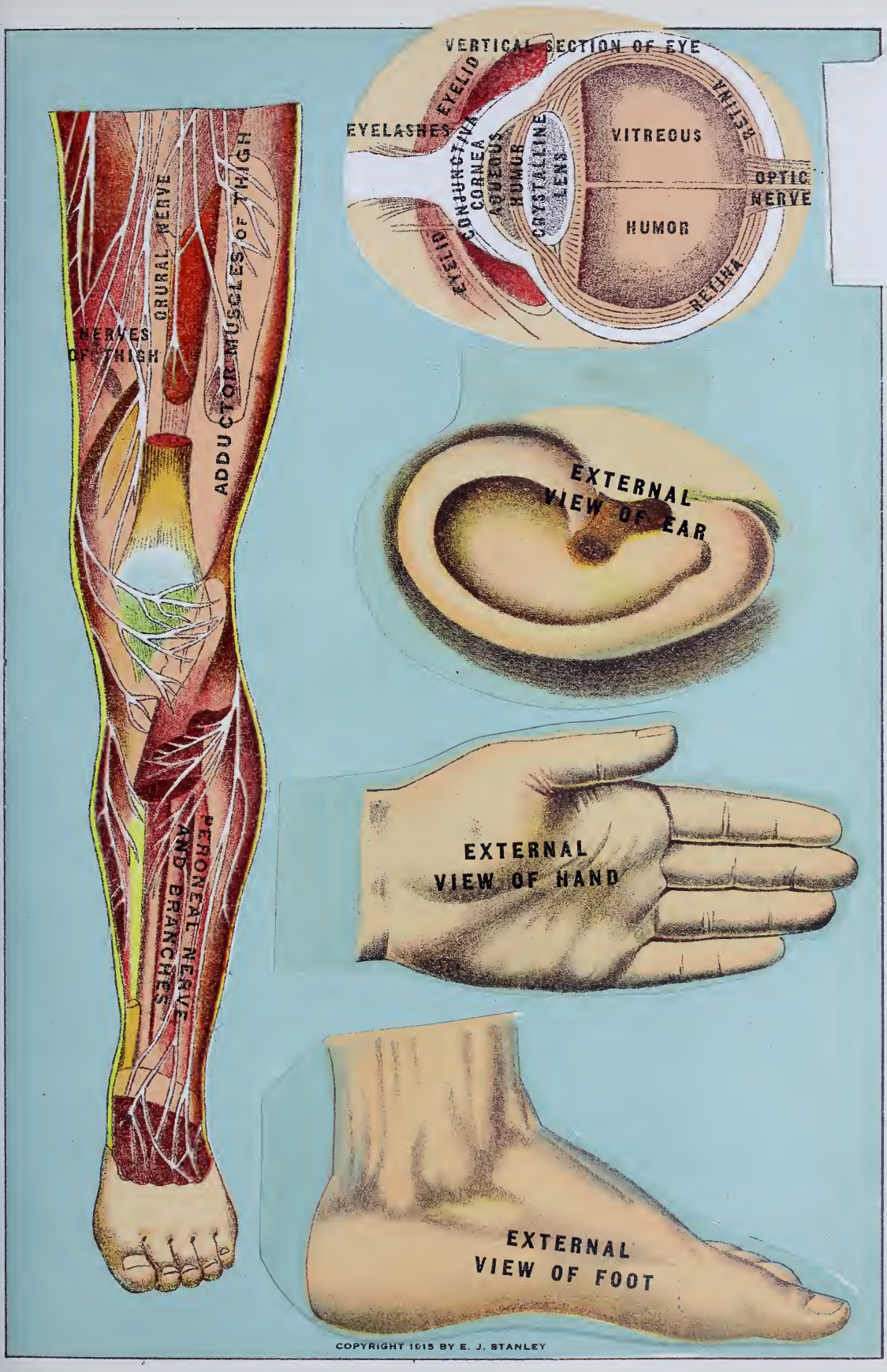


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CHART 3.

BONES OF FINGERS

BONES OF TOE

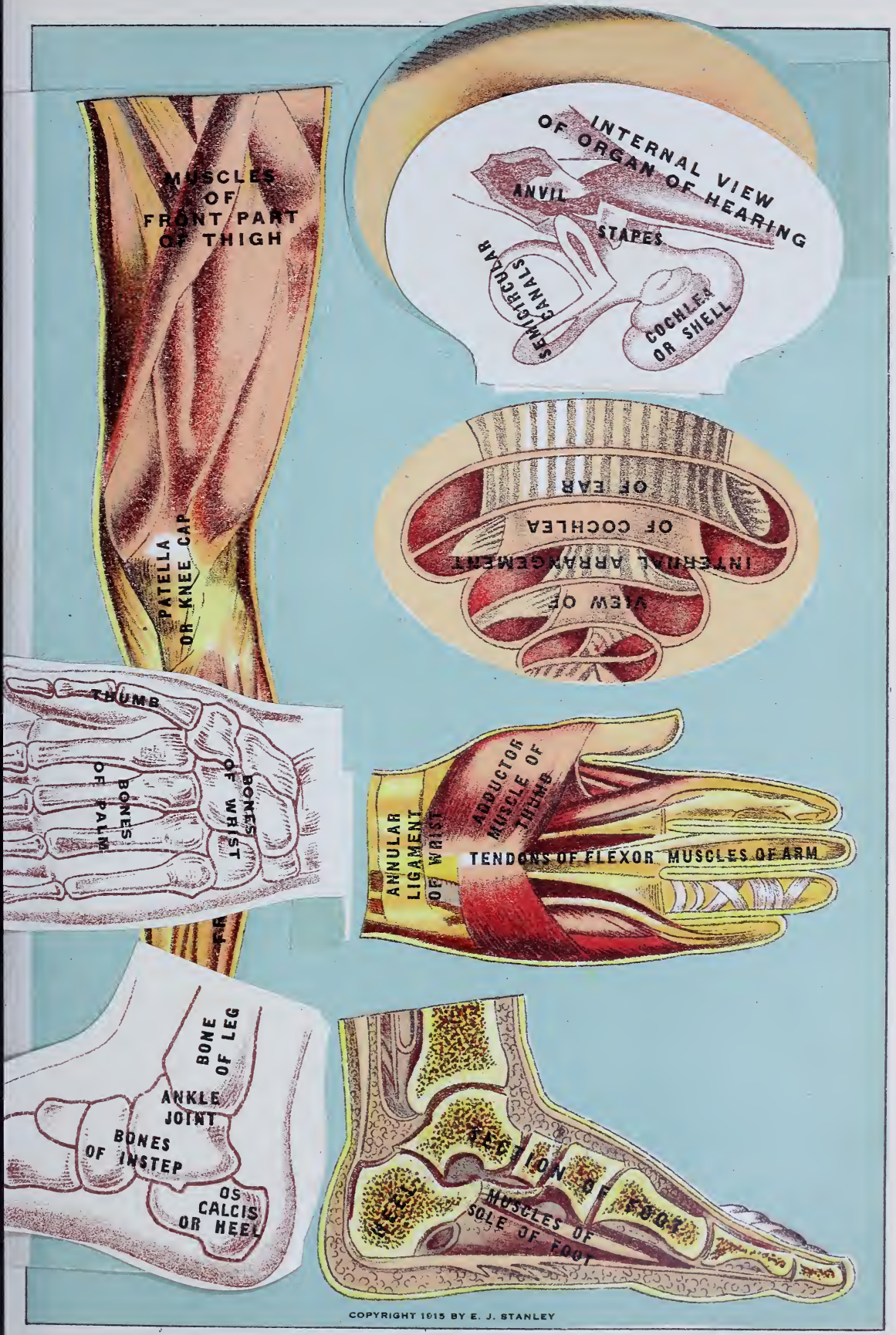
MUSCLES OF FRONT PART OF THIGH
PATELLA OR KNEE CAP
INTERNAL VIEW OF ORGAN OF HEARING
ANVIL
STAPES
SEMICIRCULAR CANALS
COCHLEA OR SHELL
VIEW OF INTERNAL ARRANGEMENT OF COCHLEA OF EAR
THUMB
BONES OF PALM
BONES OF WRIST
ANNULAR LIGAMENT OF WRIST
ABDUCTOR MUSCLE OF THUMB
TENDONS OF FLEXOR MUSCLES OF ARM
BONE OF LEG
ANKLE JOINT
BONES OF INSTEP
OS CALCIS OR HEEL
MUSCLES OF SOLE OF FOOT
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CHART 3.

distribution that the point of the finest needle cannot penetrate any part of the hand without piercing quite a number of them. The hand is the great organ of touch and prehension, and the instrument which distinguishes man in the large class of mammals, since he is the only animal which possesses two perfect and complete hands.

Bony Frame of the Hand.—On turning over this flap we behold the bony frame-work of this wonderful organ. It is seen to consist of a number of bones, so exquisitely arranged as to combine the greatest possible degree of flexibility and strength.

Palm of the Hand.—Below this is given an elegant, and at the same time a true and correct view of the muscular arrangement of the palm of the hand and fingers. Over the wrist is seen the annular ligament, that thin, tough, strong sheath, which binds the muscular cords and holds them firmly in place. Thus in these three anatomical charts have we depicted the perfection of the human hand.

Powers of the Hand.—And how varied and useful are its endowments! How wondrously adapted to the uses to which it is daily applied! Its elegance of outline, delicacy of mould and beauty of color has ever made it the attractive study of the artist; whilst its elasticity, flexibility and strength, combined with its delicate and exquisite mobility, and perfect adaptation as an organ of prehension, have led many philosophers to attribute man's high and graceful superiority even more to the hand than to the mind. Glowing thoughts are penned upon the pages of history by means of the hand; it wields the artist's pencil and brush, and makes the bare canvas an attractive and valuable work of art; now it strikes the keyboard of the piano with so delicate a touch that low, sweet, plaintive strains of music are brought forth; now the force of the blow is much greater and firmer, and louder and louder and more thrilling the musical strains.

Skill of the Hand.—The farmer's toil, the housewife's task, the dressmaker's deftness, the mechanic's skill, are all accomplished by the human hand. How constantly this little instrument aids us in expressing our feelings. It is the orator's chief aid in giving expression to his lofty strains of eloquence, or emphasizing his pathetic appeals.

Various Uses of the Hand.—With the hand we affirm or reject a proposition with more force than with the tongue. It is the first to greet, and the last to bid our friends good-bye. We use it to express our joy and pleasure, or to give vent to our fear and horror. In the hour of peril we employ it in powerful supplication to Him to whom we look for succor and help, and it adds force and power to the appeals of suffering, of

sorrow and of woe. It bestows its loving caresses on the downy cheek of the baby, invokes the blessings of Heaven, pleads for mercy, or hurls curses on our enemies. Indeed, we do not always seem to realize how many notes in the tune of human life the hand of man is made to play. Its beauties, its perfect adaptability, it varied endowments, and the different uses to which it is applied, are almost beyond our thoughts, and he who is deprived of this useful member sustains a loss that none can estimate, nor the wealth of Crœsus compensate.

THE FOOT; ITS MECHANISM AND ITS WONDERFUL ENDOWMENTS.

Arrangement and Uses of the Foot.—In this exquisite colored engraving is represented the human foot, the organ by which we stand, walk or run. Look at it carefully, aye, critically, and see if you can duplicate it in the whole range of man's achievements! The general arrangement of the bony frame-work of the foot, as seen in this illustration, is strikingly like that of the hand. The graceful arch of the foot, composed by the tarsal and metatarsal bones, is firmly joined together by a thick layer of cartilaginous structure, not only preventing a liability to displacement, but giving to it an elasticity, sprightliness and strength which could never be attained by a single flat bone. In the next colored illustration we have a section of the foot, showing its architectural dignity and perfection. On its under or plantar surface are seen stretching from the heel forward toward the toes a number of ligaments, the principal one of which is the plantar ligament, and possesses great strength and elasticity.

The Toes.—The toes are observed to be straight forward in a line with the general contour of the foot. This is their natural position. The beautiful outline of the natural foot, as here represented in these several different views, the graceful arch of the instep, the elegance of its form, its marvelous elasticity and strength, all combine to make the foot not only of great perfection and beauty, but admirably fit it for the manifold duties it is called upon to perform. Man, in his diversified labors and varied trials throughout life, is sometimes obliged to walk, run, jump, leap, climb, stand erect, lean forward, etc., and he depends upon the foot to maintain his equilibrium in the performance of these several duties.

Beauty and Strength of the Foot.—Not only does the foot, too, frequently sustain heavy weights, but it must carry them as well. It likewise affords a firm support. Were it not for this beautiful mechanism,

the constant jarring and concussion which would be experienced in the act of walking would inevitably destroy those delicate organs, the brain and spinal cord, and death would immediately follow. How few persons in civilized nations have perfectly natural feet! The beauty and utility of the human foot is marred; its movements are impeded by encasement in unnatural boots and shoes; these, instead of conforming to the form and shape of the foot, make the foot adapt itself to them. The consequence is corns, bunions, cross toes, ingrowing toe-nails, large joints, and a number of other evils from which so many suffer at the present day.

THE LEG; ITS MECHANISM AND ITS WONDERFUL ENDOWMENTS.

Leg Muscles.—In every part of the human frame there is witnessed ample evidence of design, beauty of architecture, great skill, finished workmanship, and a perfect adaptability to the duties to be performed. This fact is strikingly illustrated in the beautifully executed colored plate to which attention is now drawn, showing, as it does, at a glance, the thick, strong, muscular instruments employed and the manifold intricacies involved in the act of human locomotion. This exquisitely artistic anatomical plate represents a front view of the thigh, leg and foot, and of the fifty-four fleshy levers which give form, shape, symmetry, strength and mobility to this useful member of the body. Quite a number of the most important are seen exposed to view, after the skin and fatty tissues have been removed. We are deeply impressed with their large size and great strength, both of which correspond with the requirements demanded in the varied work which the leg is called upon to perform.

Use of the Leg Muscles.—The muscles observed in this plate are the principal instruments for carrying out the behests of the will in the acts of walking, running, leaping, climbing, and the graceful, gliding motions of the entrancing and captivating waltz; and although we see a complicated piece of machinery, yet there is perfect order. Harmony, promptitude and exactness prevail, not only in the skilful manner in which they are individually and collectively arranged, but in the action of the different muscles, each one of which performs its duty either independently of, or in connection with, its fellow lever, and that, too, without interfering in the slightest degree with the functions of the others.

Muscular Levers.—These great muscular levers bend the body forward on the thigh, and bring the legs inward toward each other, besides moving the whole body to and fro when walking, etc. The long, narrow

muscle, seen running obliquely across the thigh, is the Sartorius muscle, so-called from the fact that it crosses the legs for the sartorial (tailor's) posture. It is the longest muscle in the body.

The Knee-Pan.—The patella or knee-pan is seen held firmly in position, giving greater strength and security to this important joint. Around the ankle is observed the annular ligament, binding the long silvery thongs or tendons of the muscles of the legs, thus preventing their displacement. It also affords security and strength to the ankle joint, though not interfering with its elasticity and motion. The foot shows us the natural position and shape in which the toes should be when encased in a boot or shoe.

Thigh and Leg Bones.—On turning the flap we see the bones of the thigh and leg, and a front view of the bones of the ankle joint and foot. As was to be naturally expected, we here find the largest, the longest and strongest bone in the human body, since, with every step taken, it has to bear the entire weight of that wonderfully and fearfully constructed body, and support whatever additional burdens or weights one is called upon to impose in the course of his daily labors. The bone is observed to be compressed, somewhat cylindrical in shape, but expanded at both ends, thus giving it the greatest possible degree of strength. At its lower end it articulates, and forms a hinge-joint with the knee, the strength and protection of which is further secured by the shape and position of the knee-pan.

The Shin Bone.—The tibia or shin bone is also a very large, strong, triangular-shaped bone, enlarged at both ends; the lower end, however, where it articulates and forms a hinge-joint with the foot, is larger and more prominent than the upper end. And as if this bone was not sufficiently strong enough in itself to bear the weight of the body, our Creator, with that boundless wisdom and forethought which everywhere in the human frame we see revealed, strengthens the legs by an additional bone, which is seen running on the outer side of the shin bone, and to which it is firmly bound at both ends.

The Fibula.—Not only does this second bone—the fibula—give additional strength and support to the leg proper, but it likewise increases the bony area or surface of the leg, to which its powerful muscular levers are attached.

The Sciatic Nerve.—The large sciatic nerve, its position, course and distribution, is graphically outlined, and as we look upon this white, sensitive cord, we are deeply impressed with the force and truth of what Shakespeare makes one of his characters, *Timon,* say:

"———————— The cold SCIATICA
Cripples our senators, that their limbs may halt
As lamely as their manners."

Muscles of Thigh and Leg.—Turning to the next colored illustration, we have a graphic and faithful view of the deeper muscular arrangements of the thigh and leg, together with a striking description of the nervous supply of the lower extremity. These beautiful, silvery threads are the wires which carry the behests of the will to the muscular levers, and whose commands the muscles promptly obey; and give to the leg its wonderful and diversified endowments. To stand erect is a very difficult and complex act, and the process of walking is a no less difficult or complex function. Few persons ever realize the peril involved in walking, and it has only become safe by constant practice.

Art of Walking.—Walking requires the nicest adjustment, prompt action, and the finest calculations to maintain the dignity, proper attitude, equipoise and balance of the body. This is well illustrated when one runs up against any obstacle in the dark. We observe then with what headlong force the body is propelled forward. In walking the first thing that occurs is the inclining of the body forward; the foot is then gradually raised upon the toes, and brought from a horizontal position into an almost vertical one; at the same time the knee, which was at first considerably bent, straightens out by the advancing forward movement. Every part of the leg and thigh has changed its position except the toes; that part farthest from the toes the most of all; and gradually diminishing in geometrical proportions downward.

How We Walk.—The foot is then raised from the ground and swung forward in true pendulum fashion. The leg in so doing becomes flexed at the knee-joint, and considerably shorter, and the whole weight of the body is transferred to and supported by the leg and foot, which is planted firmly on the ground. The leg and the foot which was swinging in the air is now brought down to the ground, the muscles passing through changes just the reverse of those employed in raising it. Planting this foot firmly on the ground, to prevent the body from falling, we raise the other foot, swing it forward, the leg describing the same movements as before, repeating the process alternately with each leg. These movements constitute the act of walking; the complexity of which is fully illustrated by the complicated machinery employed for its performance, as we have seen in the beautiful plates showing the wonderful and skilful arrangements of the bones and muscles of the leg.

Grace and Ease in Walking.—In the several beautiful anatomical charts illustrating the bony, muscular and internal mechanism of the human frame we have been consciously awakened to its complexity; we have been forcibly impressed at the amazing skill and wisdom displayed in its marvelous arrangement, and at the general order, system, harmony and perfection which everywhere prevails throughout the diversified contrivance of the body. But its wonders do not stop there. The graceful motion, the ease with which we walk, run, leap, dance, etc., demonstrate with what astonishing rapidity the different muscles concerned in those movements contract and obey the impulse of the will.

The Voice.—The voice may utter one thousand five hundred letters in a minute, yet the articulation of each of those sounds requires a different and distinct position of the vocal organs, the muscles of which move with surprising celerity and swiftness.

Deftness of the Fingers.—In music we train the muscles of the fingers until they glide over the keyboard of the piano with dexterity and precision, and perform the most simple and delightfully exquisite music and on to the grand, difficult and complex passage of operatic harmony. The mind of the skilful and professional violinist is upon the music which his right hand is executing by the varied movements of the bow, yet the muscles of his left hand and fingers are deftly engaged in determining the length of the space on the strings, the character and duration of each note; and so rapidly, carefully, aye, even unconsciously are these complex movements made, that not a false note is heard, though the variation of a single hair's breadth would cause a discord, and thus spoil the pleasing effect of the music, and destroy the attractiveness of its harmony.

Muscle Development.—The bicep muscle in the arm of the blacksmith may grow strong, hard, firm, and as solid almost as a club; the legs of the pedestrian may become large and well developed; the hand of a prize fighter may be trained to strike a stunning blow with the force of a sledge hammer; while the penman can describe the most beautiful curves, the engraver trace lines so delicate and fine as to be invisible to the naked eye, and the fingers of the blind acquire a delicacy of touch that almost compensates for the missing sense. Thus there are few conceptions of the designing mind which the muscular system of man cannot be made to execute and perform.

INDEX TO BOOK II

Book II treats of Anatomy and Physiology, a knowledge of which is essential to a proper study of disease.

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Book II.

ANATOMY AND PHYSIOLOGY.

Necessity for This Book.—A brief outline of the structure or anatomy, and of the function, use or physiology of the human organism must necessarily inaugurate any book purporting to present the prevention and cure of disease, for disease means disordered function, which cannot be understood without some knowledge of the normal or regular function, which in turn necessitates a study of structure.

Plan of the Book.—As anatomy and physiology are naturally inseparable we will interweave one with the other in the following pages, the part played by an organ being given with its description.

Bodily Organs.—Every animal is composed of organs, as the heart, liver, kidney, etc., and every organ consists of tissues, of which there are four varieties: epithelial, connective, nervous and muscular. Each tissue is made of numbers of cells.

Forms of Cells.—A cell is a microscopic bag of jelly-like substance called protoplasm, which often contains within its substance a smaller cell called a nucleus, and sometimes inside the smaller cell, a tiny dot called the nucleolus.

Protoplasm.—Protoplasm is formed of water, albuminous substances, sugary material, fat and chemical salts. The chief chemical salts entering into its formation are carbon, hydrogen, oxygen and nitrogen.

Size of Cells.—Cells vary from $\frac{1}{5000}$ to $\frac{1}{120}$ of an inch in diameter; some tubes as in the hair-like blood-vessels, and some float in fluid as the blood corpuscles. Some have the power of moving from place to place, ameboid motion.

Human Body Compared to a City.—The human body may be compared in its arrangement to a city, the houses being the organs; the brick, stone, wood and metal the tissues, and the individual bricks, fragments of stone, boards or pieces of metal the cells.

Human Body Compared to an Army.—Huxley compares it to an army,

"each cell is a soldier, an organ a brigade, the central nervous system the headquarters and field telegraph, and the alimentary and circulatory systems the commissariat." The function of a cell is the same as that of a human being, they absorb food and grow, fill special offices, as protecting, secreting, etc., reproduce and die.

Epithelium.—Epithelial tissue or epithelium means literally upon the nipple. It covers the entire outside of the body, as the skin, the inside of the respiratory, alimentary and genito-urinary apparatuses as mucous membrane, and dips down into the various glands which open on the skin and mucous membrane.

Figure 8.—PAVEMENT EPITHELIUM.

Skin Arrangement.—On the skin it is arranged in layers as pavement epithelium (Fig. 8) and acts as a protection to the delicate structures beneath. In some places, as in the hair and nails, it is much modified to more effectually guard against injury.

Shape in the Stomach.—In the stomach, intestines and elsewhere the epithelial cell is oblong in profile (Fig. 9) and is called columnar epithelium.

Figure 9.—COLUMNAR EPITHELIUM.

Cilia of Windpipe.—Some epithelium, like that in the windpipe, has projecting from it long waving filaments called cilia (Fig. 10). The cilia wave constantly, acting as brooms, which keep the windpipe clean.

Figure 10.—CILIATED EPITHELIUM.

Glandular Epithelium.—Secretory or glandular epithelium (Figs. 11 and 12) is found in the glands, varies in shape, and

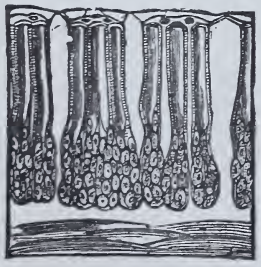

Figure 11.—SIMPLE GLAND.

Figure 12.—RACEMOSE GLAND.

is the essential portion of the gland, *i. e.*, the portion which manufactures the special secretion from the blood.

Endothelium.—Endothelium, lining serous sacs, joint cavities (synovial sacs), and the blood and lymphatic vessels, is analogous to epithelium.

Connective Tissue.—Connective tissue occurs as bone, cartilage and fibrous connective tissue.

Bone Structure.—Bone is fibrous tissue cemented with petrified cement. It consists approximately of one-third animal and two-thirds earthy material, the principal earthy constituents being the phosphate and carbonate of lime; lining bone is pinkish in color and oozes blood when cut.

Periosteum.—Externally it is covered by a membrane called periosteum. The shafts of long bones are hollow, the cavity being filled by the marrow, which consists of blood and lymph vessels, nerves and fat supported by fibrous tissue.

Tissue of Bones.—Bone tissue is of two kinds, spongy, which forms the very thin bones and the ends of long bones, and compact, which is found in the shafts of long bones and in the outside of flat bones. Spongy bone is made up of a meshwork of bony arches, the spaces filled with vessels, bone cells and connective tissue.

Compact Bone. — Compact bone (Fig. 5) consists of a series of concentric layers of bone disposed around a canal called the Haversian canal which affords the passage for the blood-vessels. The layers of bone are separated from each other by small spaces called lacunæ, and passing through the bony layers and connecting the lacunæ are many fine channels called canaliculi; they serve to convey nourishment to the bone cells. The function of bone is to support, to protect, and to give attachment to muscles.

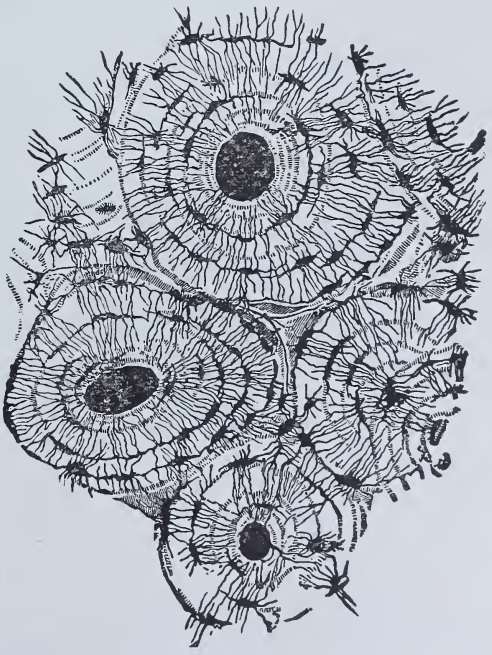

Figure 5.—SECTION OF BONE, MAGNIFIED.

Structure of Gristle.—Cartilage or gristle (Fig. 4) is fibrous tissue glued together by a substance containing chondrine. It has no blood-vessels but is nourished by lymph which filters through it by means of small spaces and canals analogous to the lacunæ and canaliculi of bone.

Use of Gristle.—Cartilage forms a smooth covering for the ends of bones entering into a joint; acts as a buffer between the bones of the spine, prevents certain tubes, like the windpipe, from collapsing, and as in the external ear gathers sound.

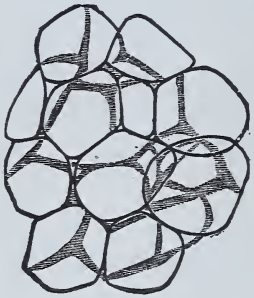

Figure 3.

Figure 4.

Figure 3.—FAT.
Figure 4.—CARTILAGE. } Magnified.

Fibrous Tissue.—Fibrous tissue consists ultimately of fibres which are developed from spindle-shaped cells. Its function is to hold the various

Figure 57.—NERVE CELLS.

parts of, and the organs themselves, together. Fatty tissue (Fig. 3) is fibrous connective tissue unfiltrated with fat.

Nervous Tissue.—Nervous tissue is either gray, which is a mass of tailed cells (Fig. 57) supported by a fine connective tissue (neuroglia), or

white, which is made of bundles of little nerve febrils, each febril is the tail of a cell in the gray nervous tissue and is surrounded in some places by the white substance of Schwann (Fig. 58) and by a primitive sheath.

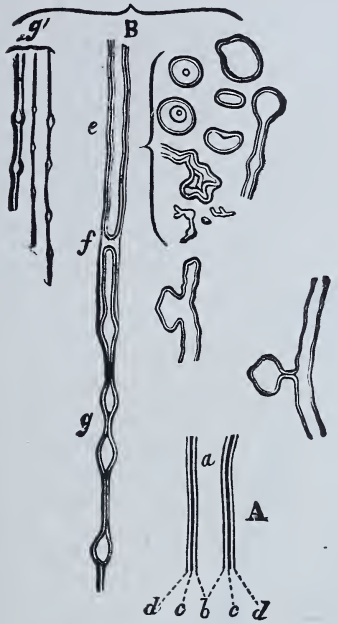

Figure 58.—NERVES. a, axis cylinder; b, inner border of white substance; c, c, outer border of same; d, d, tubular membrane; B, tubular fibres; e, in natural state; f, under pressure; g, varicose fibres.

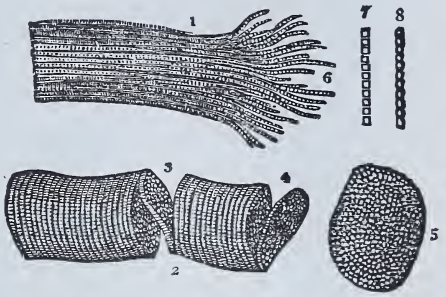

Figure 6.—STRIPED MUSCLE. 1, longitudinal section; 2, 3, 4, cross section; 5, detached disk; 7, 8, fibrillæ.

Muscular Tissue.—There are two kinds of muscular tissue, the voluntary or striped, and the involuntary or non-striated. Voluntary muscle (Fig. 6) is composed microscopically of the primitive fasciculi (minute bundles of febrils), each febril of which consists of a row of disks (Fig. 6) called sarcous elements. Involuntary muscle is built of a number of non-striped, spindle-shaped cells (Fig. 7) which branch and join with one another.

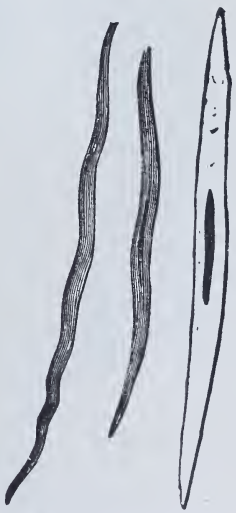

Figure 7.—NON-STRIATED MUSCLE.

THE BONES.

Framework of the Body.—The body skeleton (Fig. 13) forms the framework of the body. Bones are divided into long, short and flat bones. The long bones consist of a hollow shaft of compact bone, and two broader extremities of cancellated bone. They are found in the extremities and form levers by which the trunk is moved.

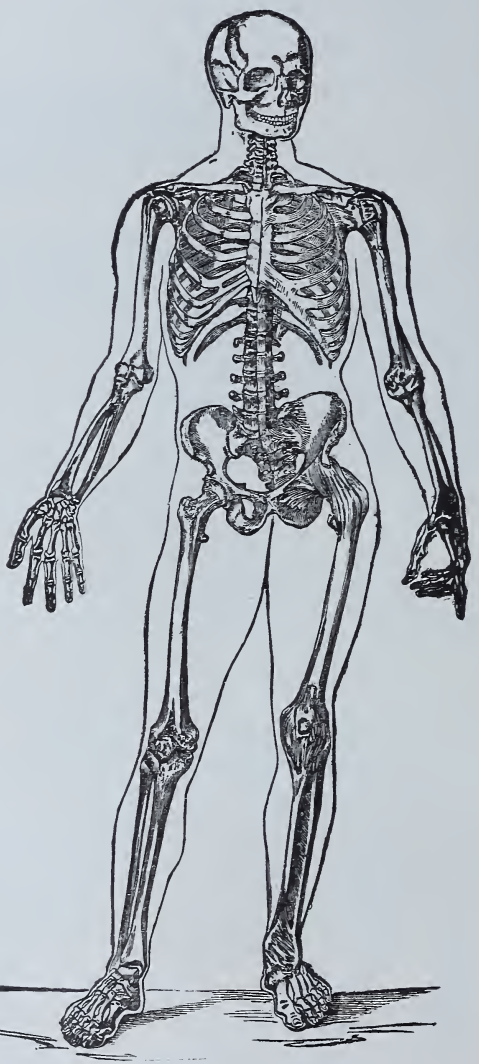

Figure 13.—HUMAN SKELETON.

Short Bones.—Short bones are placed where strength is more necessary than mobility, as in the hand and foot; their structure is spongy, covered by a thin layer of compact bone.

Flat Bones.—The flat bones are found where protection of important organs is necessary, as in the skull, sternum and scapulæ. They consist of two tables of compact bone filled in with cancellous tissue. Certain bones do not belong to one class alone and are called mixed bones.

Number of Bones.—There are in the adult skeleton, excluding the teeth, ossicles of the ear, and Wormian bones, 200 separate bones. These are:

In the spinal column	26
In the skull	8
In the face	14
Ribs, breast bone and hyoid bone	26
Upper extremity	64
Lower extremity	62

THE SPINE.

Spinal Column.—The spine (Fig. 14) is a flexible column made of small bones called vertebræ, seven cervical, twelve dorsal, five lumbar, five sacral and four coccygeal vertebræ.

Spinal Vertebræ.—A vertebra (Figs. 16 and 17) consists of a solid portion in front called the body, and an arch behind, so that when placed

Figure 16.

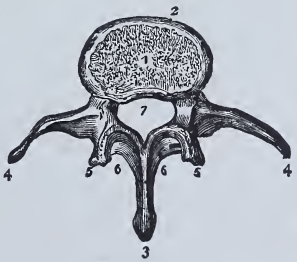

Figure 17.

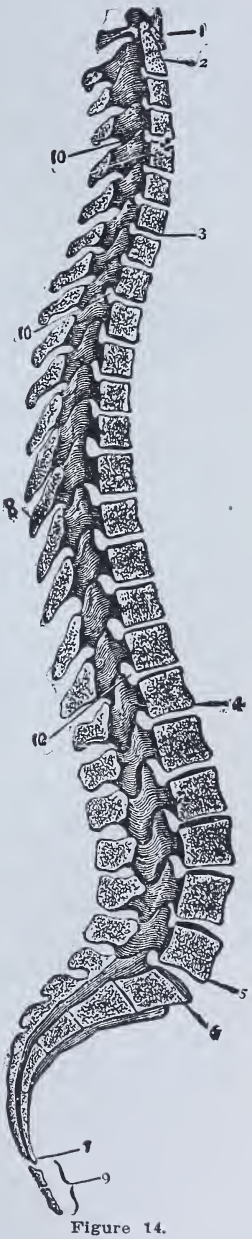

Figure 14.

Figure 14.—SPINAL COLUMN. 1, atlas; 2, axis; 3, vertebra prominens; 4, twelve dorsal; 5, fifth lumbar; 6, 7, sacrum; 8, coccyx; 9, a spinous process; 10, 10, intervertebral foramina.

Figure 16.—DORSAL VERTEBRA. 1, body; 2, facet for rib; 3, superior surface body; 4, 5, intervetebral notch; 6, spinous process; 7, articular facet for tubercle of a rib; 8, 9, articular processes.

Figure 17.—LUMBAR VERTEBRA. 1, body; 2, front of the body; 3, spinous process; 4, transverse process; 5, articular process; 6, arch; 7, spinal foramen.

one above the other, as in Figure 14, the bodies of the vertebræ form a support for the body and the arches a canal which contains and protects the spinal cord. The arches are formed by a plate of bone on each side (lamina) joined to the body or constructed portion of bone (pedicle) and unite behind to form the spinous process, which is the portion one feels when running a finger down the back.

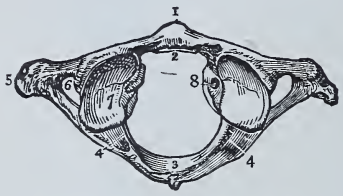

Figure 15.—ATLAS. 1, anterior tubercle; 2, facet for axis; 3, posterior surface spinal canal; 4, 4, intervertebral notch; transverse process; 5, foramen for vertebral artery; 7, superior articular process; 8, tubercle for transverse ligament.

The Atlas.—The first cervical vertebra or atlas (Fig. 15) has neither body nor spinous process, but consists of an anterior and posterior arch and two lateral masses on which rests the skull. The axis, or cervical vertebra has a projection from the upper surface of its body (odontoid process) which fits in the anterior arch of the atlas, permitting the head with the atlas to be rotated from side to side.

The Sacrum.—The sacrum consists of five vertebræ welded into one bone. It is triangular in shape and is wedged in between the haunch bones, forming the back of the pelvis. Attached to its apex is the coccyx, which consists of four vertebræ, so joined as to form one bone.

Ligaments.—The vertebræ are tied together by ligaments. Between each vertebra and its neighbor is a disk of cartilage, which acts as a buffer to prevent shock and allows the spine to bend in various directions.

THE SKULL.

Bones of the Skull.—The skull is divided into the cranium or brain case and the face. The cranial bones are one occipital, two parietal, one frontal, two temporal, one sphenoid and one ethmoid. The occipital bone forms the back and under part of the skull. It is perforated by a large opening (foramen magnum) which transmits the spinal cord to the spinal canal. The cerebellum rests on its inner or upper surface, the external surface gives attachment to muscles.

Side and Top Bones.—The parietal bones form the sides and top of the cranium, joining in the median line and being placed between the occipital bone behind and the frontal bone in front.

Frontal Bone.—The frontal bone forms the forehead and forms the roof of the orbit, on the upper surface of which rests the brain. The

orbital plates are separated by the ethmoid bone, which is spongy and filled with perforations which transmit the nerves of smell to the nose.

Temporal Bone.—The temporal bone consists of a squamous or scale-like portion which overlaps the parietal bone, and a petrous or stony portion which helps form the floor of the cranium. The petrous portion lodges in the internal and middle ear.

Sphenoid Bone.—The sphenoid resembles a butterfly in shape. It is

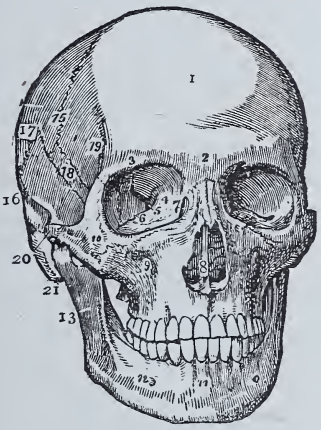

Figure 18.

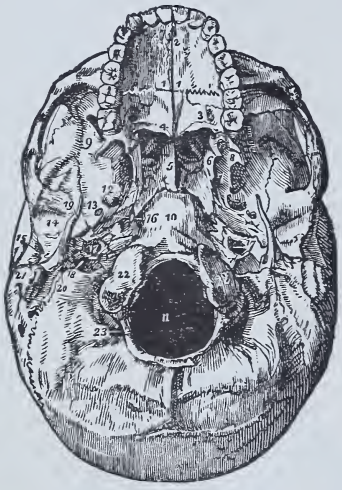

Figure 19.

Figure 18.—FRONT OF THE SKULL. 1, os frontalis; 2, globella; 3, supraorbital ridge; 4, optic foramen; 5, sphenoidal fissure; 6, spheno-maxillary fissure; 7, lachrymal fossa; 8, anterior nares; 9, infraorbital foramen; 10, malar bone; 11, symphysis menti; 12, anterior mental foramen; 13, ramus of the lower jaw; 14, parietal bone; 15, coronal suture; 16, temporal bone; 17, squamous suture; 18, great wing of the sphenoid.

Figure 19.—BASE OF THE SKULL. 1, hard palate; 2, foramen incisivum; 3, palatine plate of palate bone; 4, crescenteric ridge; 5, vomer; 6, internal pterygoid plate; 7, pterygoid fossa; 8, external pterygoid plate; 9, temporal fossa; 10, basilar process; 11, foramen magnum; 12, foramen ovale; 13, foramen spinale; 14, glenoid fossa; 15, meatus aditorius externus; 16, foramen lacerum anterius; 17, carotid foramen; 18, foramen lacerum posterius; 19, styloid process; 20, stylo-mastoid foramen; 21, mastoid process; 22, condyles of occipital bone; 23, posterior condyloid foramen.

the keystone of cranial architecture binding the bones of the head firmly together.

Facial Bones.—The facial bones are: two nasal bones, forming the bridge of the nose; two superior maxillary (upper jaw); two lachrymal, forming a portion of the inner wall of the orbit; two malar or cheek bones; two palate bones forming the back part of the roof of the mouth and the corresponding portion of the floor of the nose; two inferior turbinated bones which are scrolls of bone placed in either nostril; one vomer, forming the partition between the nostrils; and the lower jaw or inferior

maxillary bone, horseshoe in shape, joining with the temporal bone above and being freely movable below to permit chewing, talking, etc.

Hyoid Bone.—The hyoid bone is U-shaped, situated in the neck just above the larynx and gives attachment to many muscles of the tongue and throat.

THE THORAX.

The Chest.—The thorax or chest is an elastic bony cage made by the breast bone in front, the spine behind, and the ribs and their cartilages at the sides. It is filled by the heart and lungs, which it protects. The sternum or breast bone occupies the middle line anteriorly, is flat, and is made of three pieces, the manubrium (handle), the gladiolus (blade), and the pointed extremities, the ensiform or xiphoid appendix, these names were given by the ancients who compared it to a sword.

The Ribs.—There are twenty-four ribs (Fig. 20), twelve on each side. They are joined to the vertebra behind and to the sternum, by means of cartilages, in front. They are irregularly semicircular in shape, flattened anteroposteriorly, and slightly twisted on themselves. The head joins the vertebra behind, the neck is the constriction in front of the head and the angle, the point of greatest curvature. The seven upper ribs unite directly with the sternum and are called true ribs. The other five are called false ribs, the upper three being united in front to the cartilages of the ribs above them, and the last two having no attachment in front are termed floating ribs.

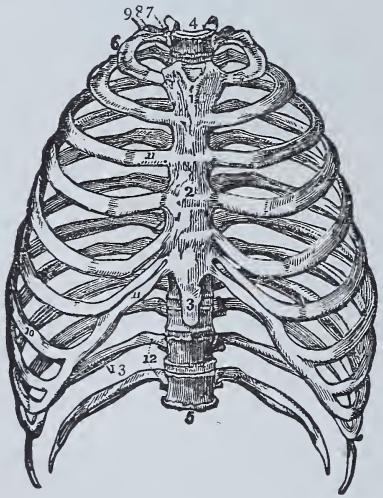

Figure 20.—THORAX. 1, manubrium; 2, gladiolus; 3, ensiform process; 4, first dorsal vertebra; 5, twelfth dorsal vertebra; 6, first rib; 7, its head; 8, its neck; 9, its tubercle; 10, last true rib; 11, its cartilage; 12, angle of eleventh rib; 13, its body.

THE UPPER EXTREMITY.

The Shoulders.—The upper extremity consists of the shoulder, the arm, the forearm, and the hand. The bones of the shoulder are the clavicle and scapula connecting the arm with the trunk. The clavicle, collar, or key-bone is a short bone curved like the letter *f*, running horizontally between the sternum and scapula.

The Scapula.—The scapula (Fig. 21) forms the back of the shoulder, is triangular in shape, the apex pointing downward and lies on the ribs. On the upper part of the outer surface is a thick triangular spine, the outer extremity of which (the acromion) forms the point of the shoulder.

Socket of the Shoulder.—Beneath this process the upper angle is hollowed out to relieve the upper end of the arm bone. In front of this depression is a curved prominence, the coracoid process.

Arm Bone.—The humerus (Fig. 22) or arm bone consists of a long cylindrical shaft, having a rounded head above for articulation with the

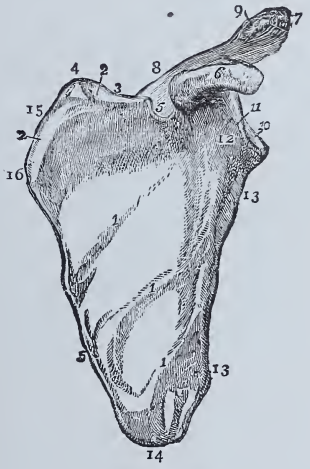

Figure 21.

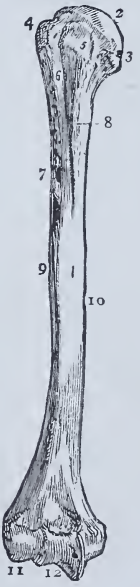

Figure 22.

Figure 21.—SCAPULA. 1, 1, 1, oblique ridges; 2, 2, subscapular fossa; 3, superior border; 4, superior angle; 5, supra-scapular notch; 6, coracoid process; 7, acromion process; 8, spine of scapula; 9, articular surface; 10, glenoid cavity; 11, head of scapula; 12, neck; 13, inferior border; 14, inferior angle; 15, posterior border; 16, origin of the spine.

Figure 22.—HUMERUS. 1, shaft; 2, head; 3, anatomical neck; 4, greater tuberosity; 5, lesser tuberosity; 6, bicipital groove; 7, ridge pectoralis major; 8, internal bicipital ridge; 9, insertion of deltoid muscle; 10, nutrient foramen; 11, facet for radius; 12, facet for ulna.

scapula, and a broad flattened lower extremity for articulation with the forearm bones.

The Forearm.—The bones of the forearm are the ulna and the radius. The ulna (Fig. 24) lies on the inner side of the forearm when the palm of the hand faces upward. The upper extremity which joins the humerus, has two processes, the olecranon, forming the point of the elbow and the coronoid process, which complete the hinge joint of the elbow in front.

The lower end of the ulna is small and does not articulate with any bone of the wrist.

The Radius.—The radius (Fig. 23) lies on the outer side of the forearm. It has a cup-shaped head for articulation with the humerus. The rounded edge of the head fits in a concavity of the ulna and is surrounded

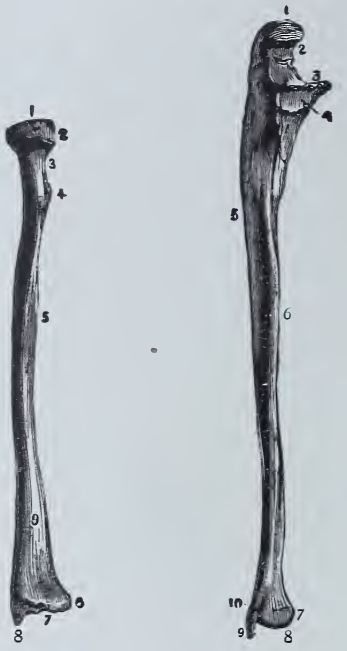

Figure 23.

Figure 24.

Figure 25.

Figure 23.—RADIUS. 1, head; 2, articulates with ulna; 3, neck; 4, tuberosity; 5, interosseus ridge; 6, articulates with ulna; 7, carpal surface; 8, styloid process; 9, insertion of pronator quadratus.

Figure 24.—ULNA. 1, olecranon; 2, sigmoid cavity; 3, coronoid process; 4, lesser sigmoid cavity; 5, external surface; 6, interosseus ridge; 7, articulates with radius; 8, carpal surface.

Figure 25.—CARPUS. 1, ulna; 2, radius; 3, interarticular cartilage; 4, metacarpal of thumb; 5, 6, 7, 8, metacarpal bones of fingers; S, scaphoid; L, semilunar; C, cuneiform; P, pisiform; T, T, trapezium and trapezoid; M, magnum; U, unciform.

by a sling-like ligament, which allows the head to rotate. The lower extremity is larger and is hollowed out to fit the wrist bones.

The Wrist.—The wrist or carpus consists of eight small bones in two rows (Fig. 25). In the upper row, beginning at the radial side, are the scaphoid, semilunar, cuneiform, and pisiform bones; in the lower row, the trapezium, trapezoid, or magnum and unciform bones.

The Hand.—The hand is made of five short cylindrical bones called the metacarpal bones (Fig. 25), to the lower extremity of which are

attached the finger bones or phalanges, there being two for the thumb and three for each finger.

THE LOWER EXTREMITY.

Parts of Lower Extremity.—The lower extremity consists of three parts, the thigh, the leg and the foot, and is united to the trunk by the os innominatum or haunch bone, which bears the same relation to the lower extremity that the bones of the shoulder do to the upper extremity.

The os innominatum (Fig. 26) consists of the ilium, ischium and pubes, which in the adult grow together and form one single bone. It is irregularly oblong in shape and twisted upon itself. The ilium is the broad upper part of the bone and forms the prominence of the hip. The ischium is the V-shaped lower portion upon which we sit. The pubes is situated in front and is also V-shaped; in the adult the upper part is covered by hair. Between these V-shaped bones is a large opening, the obturator or thyroid foramen.

Hip Socket.—At the junction of the three bones is a cup-shaped cavity, the acetabulum or socket of the hip, which receives the rounded head of the thigh bone. In front the pubic bones join and behind the sacrum complete the bony ring of the pelvis. The pelvis (Fig. 26) is basin-shaped, supports the contents of the abdomen and the trunk upon the limbs.

Thigh Bone.—The femur (Fig. 27) or thigh bone is the largest and strongest bone in the body. It consists of a shaft and two extremities. The upper extremity consists of a head which is spherical and smooth, fitting into the acetabulum, and a neck which joins the shaft at an obtuse angle. The shaft supports the body, is an important lever in locomotion and gives attachment to muscles. The lower extremity resembles the lower end of the humerus; it is smooth and joins with the main bone of the leg, the tibia.

Knee Pan.—The patella or knee pan is a small flat bone situated in the huge tendon of the great muscles on the front of the thigh. It protects the knee joint and increases the leverage.

Leg Bones.—The leg bones are the tibia or shin bone (Fig. 27a) and the fibula (Fig. 28). The tibia, the larger and stronger, is expanded above to join the femur; the shaft is triangular, the sharp edge in front may be readily felt beneath the skin as the shin. The lower extremity

forms the inner part of the ankle joint. The fibula (Fig. 28) is a long, slender bone lying on the outside of the leg. Its upper end joins the ex-

Figure 26.

Figure 26.—MALE PELVIS.

panded upper extremity of the tibia, strengthening it, the lower end forms the outer part of the ankle joint.

Foot Bones.—The foot (Fig. 29) consists of the tarsus or ankle bones, the metatarsus or foot bones and the phalanges or toe bones. The bones of the tarsus are the calcaneum, os calcis, or heel bone, the astragalus which joins the bones of the leg, the cuboid, the scaphoid and the three cuneiform bones. There are five metatarsal bones corresponding to the metacarpar bones of the hand. The phalanges are similar to those of the hand, there being two for the great toe and three for each of the other toes.

THE JOINTS.

Where two bones meet a joint or articulation exists. The bones may be so soldered together (Fig. 30) as to form an immovable joint, as in the bones of the skull; they may be slightly movable as the pelvic and vertebral joints, or they may be freely movable as in most of the articulations of the limbs. The freely movable joints (Fig. 31) are the hinges, as the elbow; the ball and socket, as the shoulder; the gliding, as the sterno, clavicular articulation and the ring and pivot (Fig. 32) joint, as the atlo-axoid articulation. The structures entering into joint formation are bones,

cartilages, ligaments and synovial membrane which secretes the lubricating fluid of the joint. (Figs. 30, 31 and 32.)

Figure 27.

Figure 27a.

Figure 28.

Figure 29

Figure 27.—FEMUR. 1, depression for round ligament; 2, head; 3, depression for rotary muscles; 4, great trochanter; 5, lesser trochanter; 6, roughness for gluteus maximus; 7, linea aspera; 8, gastrocnemius insertion; 9, external condyle; 10, depression for anterior crucial ligament; 11, depression for posterior crucial ligament; 12, origin of internal lateral ligament.

Figure 27a.—TIBIA. 1, spine; 2, articulates with femur; 3, facet for fibula; 4, head; 5, tubercle; 6, 6, shaft; 7, internal malleolus; 8, attaches internal lateral ligament of ankle; 9, tarsal surface; 10, facet for fibula.

Figure 28.—FIBULA. 1, head; 2, articular facet; 3, insertion of external ligament; 4, shaft; 5, 5, external face; 6, interosseus ridge; 7, facet for tibia; 8, external malleolus; 9, tarsal surface.

Figure 29.—FOOT BONES. 1, astragalus; 2, its anterior face; 3, os calcis; 4, scaphoid; 5, internal cuneiform; 6, middle cuneiform; 7, external cuneiform; 8, cuboid; 9, 9, metatarsal bones; 10, first phalanx of big toe; 11, second phalanx; 12, 13, 14, phalanges of other toes.

It will be unnecessary to describe the individual joints, reference having already been made to them in the section on bones.

THE MUSCLES.

Function of Muscles.—Muscles are familiar as the flesh of animals. They are attached to bones, ligaments, cartilages and the skin, and by their contractions cause all the movements of the body. Some muscles are arranged in sheets (Fig. 33), some are spindle-shaped, some are disposed

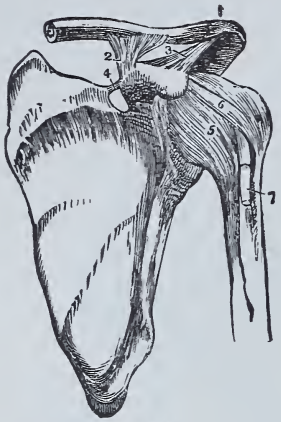

Figure 30.

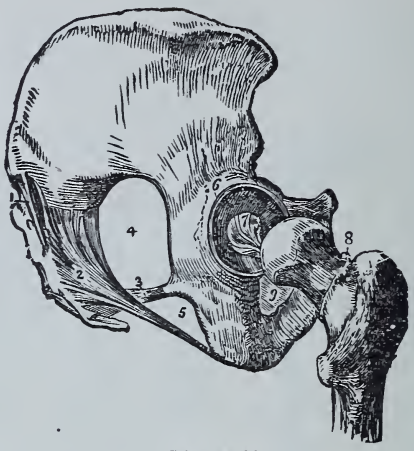

Figure 31.

Figure 30.—ACROMIO-CLAVICULAR and SHOULDER JOINTS. 1, upper acromio-clavicular ligament; 2, coraco-clavicular ligament; 3, coraco-acromial ligament; 4, coracoid ligament; 5, capsular ligament of shoulder; 6, coraco-humeral ligament; 7, long head of biceps.

Figure 31.—HIP JOINT. 1, posterior sacro-iliac ligament; 2, greater sacro-sciatic ligament; 3, lesser sacro-sciatic ligament; 4, great sciatic notch; 5, lesser sciatic notch; 6, cotyloid ligament; 7, ligamentum teres; 8, attachment for capsular ligament; 9, obturator ligament.

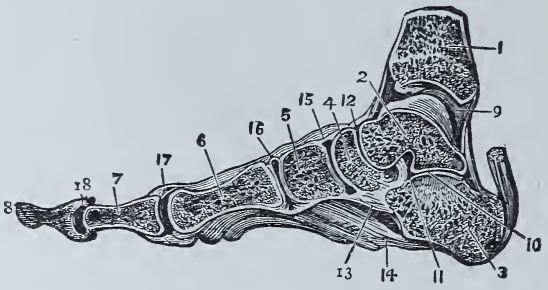

Figure 32.

Figure 32.—SECTION OF ANKLE JOINT. 1, tibia; 2, astragalus; 3, os calcis; 4, scaphoid; 5, internal cuneiform; 6, metatarsal of big toe; 7, 8, first and second phalanges of great toe; 9, articular cavity between tibia and astragalus; 10, synovial capsule between astragalus and os calcis; 11, calcaneo-astragaloid ligament; 12, synovial capsule between astragalus and scaphoid; 13, calcaneo scaphoid ligament; 14, calcaneo-cuboid ligament; 15, synovial capsule between scaphoid and internal cuneiform; 16, synovial capsule between internal cuneiform and first metatarsal; 17, metatarso-phalangeal articulation of great toe; 18, phalangeal articulation of great toe.

in rings like the muscle which closes the mouth, and in some the fibres spread out like a fan.

Muscle Attachments.—They are attached by fibrous cord, the tendons, or by broad fibrous bands, the aponeuroses. The end of the muscle which has the firmer attachment is called its origin (Fig. 34), the other end its

insertion; this is, as a rule, merely relative, as in most cases the muscles act from either extremity; for instance, the sterno-cleido mastoid, the muscle which forms the prominent cord at either side of the neck, has its

Figure 33.

Figure 33.—MUSCLES, BACK VIEW. The fascia is left upon the left limbs; removed from the right.

origin from the top of the breast bone and the end of the collar bone, and its insertion into the bony prominence of the skull behind the ear, its action is to bow the head and turn the face to the opposite side; but if the

head be fixed it serves to raise the ribs and is thus an accessory muscle of respiration.

Face Muscles.—Of the numerous small muscles of the face (Fig. 35), it is not necessary to speak here; as a rule they arise from the bones of the

Figure 34.

Figure 34.—MUSCLES, FRONT VIEW. On the right half, superficial muscles; left half, deep muscles.

face and are inserted into the skin, by their mobility giving expression to the countenance.

Muscles of Chewing.—The muscles of the orbit will be taken up in

connection with the eye. The muscles of mastication are the temporal, masseter, the two pterygoids and the buccinator. The temporal arises from the side of the head above the ear and is inserted into the top of the lower jaw. The masseter runs from the bony process external to the orbit, to the angle of the jaw and forms the hard mass felt in the cheek when the jaw is tightly closed.

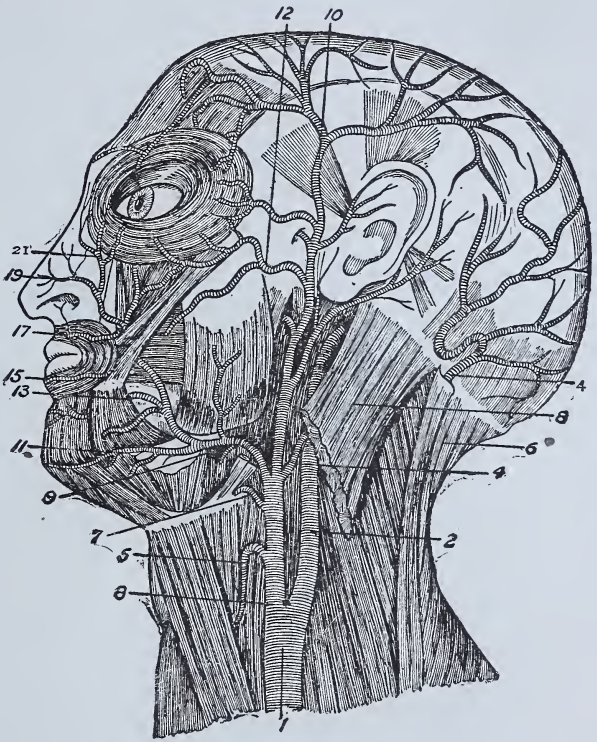

Figure 35.

Figure 35.—MUSCLES OF FACE, JAW AND NECK. 1, longus colli; 2, trapezius; 3, sterno-hyoid; 4, sterno-mastoid; 5, crico-thyroid; 6, trapezius; 7, constrictor of pharynx; 8, sterno-mastoid; 9, digastric; 10, attrahens aurem; 11, mylo-hyoid; 12, masseter; 13, depressor of lower lip; 15, orbicularis oris; 17, levator of upper lip; 19, levator of angle of mouth; 21, orbicularis palpebrarum.

Muscles of the Jaw.—The pterygoids run from the base of the skull to the lower jaw, moving it laterally. The buccinator is a broad, flat sheet in the cheek compressing the cheeks as when blowing or whistling, etc.

The sterno-cleido mastoid has already been mentioned above. The muscles of the larnyx will be spoken of in connection with diseases of the throat.

Muscles of the Back.—The most important muscles of the back are the trapezius, which pulls the head back or the shoulder upward or back-

ward and which runs from the occipital bone and the spine as far as the middle of the back, to the shoulder bones; the latissimus dorsi, which draws the arm downward and backward, and which arises from the lower ribs, the lower half of the spine and the haunch bone and is inserted into the arm bone near its head; and the erector spinæ which arises from the pelvis and lumbar vertebræ and is inserted into all the vertebræ above; it maintains the spine erect.

Muscles of Thorax.—Concerning the thorax we may mention the

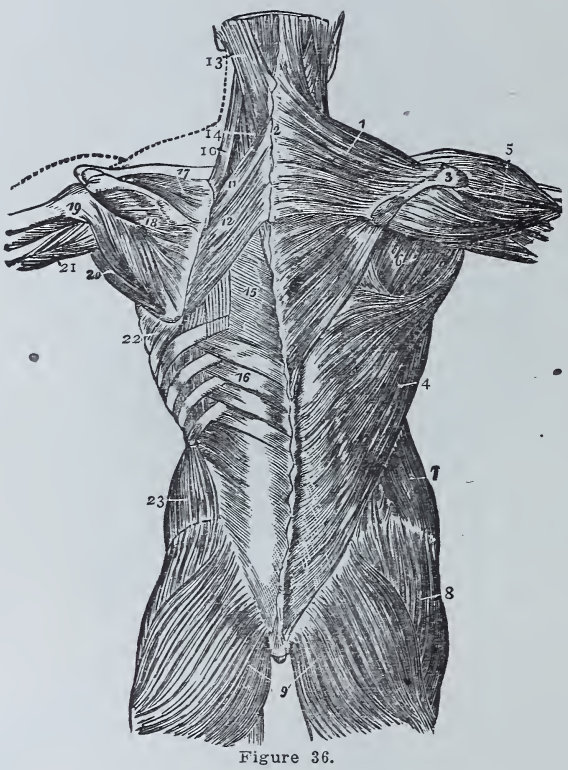

Figure 36.

Figure 36.—MUSCLES OF BACK. 1, trapezius; 2, its origin; 3, spine of scapula; 4, latissimus dorsi; 5, deltoid; 6, infra-spinatus; 7, external oblique; 8, gluteus medius; 9, gluteus maximus; 10, levator scapulæ; 11, rhomboideus minor; 12, rhomboideus major; 13, splenius capitus; 14, splenius colli; 15, origin latissimus dorsi; 16, serratus inferior posticus; 17, supra-spinatus; 18, infra-spinatus; 19, teres minor; 20, teres major; 21, long head triceps; 22, serratus major anticus; 23, internal oblique.

intercostal (between the ribs) muscles, external and internal, the external set raising the ribs and the internal set depressing the ribs in respiration.

The Diaphragm.—The diaphragm is a musculo-fibrous partition forming the dome of the abdomen and separating it from the thorax. It is

attached to the lower ribs and spinal column and is perforated by the aorta, inferior vena cava and gullet. It is a muscle of respiration and expulsion.

The Abdomen.—The abdomen is completed in front and at the sides by a thick wall of muscles which not only aid in protecting the underlying structures but assist in expelling the urine, feces, etc., from the body. This wall is made of the external oblique muscle which runs from the ribs downward and inward to the pelvic bones and linea alba—the linea alba or white line occupies the midline of the abdomen and is formed by the union of the various muscular structures of the abdominal wall; the internal oblique muscle arises from the ilium and lower fibrous part of the external oblique (Poupart's ligament), runs upward and inward to be inserted into the linea alba and lower ribs; the transversalis which runs transversely between the brain, spine, ribs and pelvis to the linea alba, and the rectus abdominalis which is situated near the middle line of the body and runs from the ribs to the pelvis.

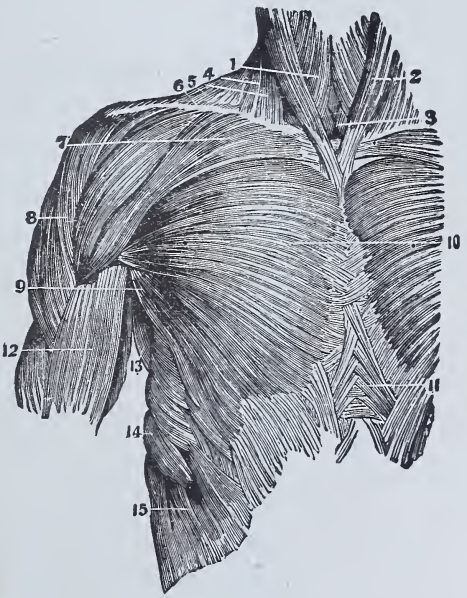

Figure 37.

Figure 37.—CHEST MUSCLES. 1, sterno-hyoid; 2, sterno-mastoid; 3, sterno-thyroid; 4, sterno-mastoid; 5, trapezius; 6, clavicle; 7, origin pectoralis major; 8, deltoid; 9, lower edge pectoralis major; 10, middle pectoralis major; 11, fibres external oblique; 12, biceps; 13, teres major; 14, serratus major anticus; 15, external oblique interlocking with serratus major.

Breast Muscles.—The pectoralis major and minor muscles form the fleshy masses of the breast. They run from the collar-bone, breast-bone and ribs to the caracoid process of the scapula and the humerus, the fibres converging from their origins to their insertions. They draw the shoulder forward and the arm across the chest.

Deltoid Muscle.—The deltoid (Fig. 37) forms the prominence of the shoulder. It arises from the clavicle and scapula, the fibres converging to be inserted into the humerus just above the middle. It raises the arm from the side.

The Biceps.—The biceps forms the prominence on the front of the

arm when the forearm is flexed. It arises from the scapula by two heads and is inserted into the upper end of the radius. It flexes the forearm and assists in supinating or turning it over.

The Triceps.—The triceps arises from the shoulder blade and the back of the humerus by three heads, and is inserted into the upper end of the ulna. It extends the forearm.

Muscles of Forearm.—The muscles of the forearm are very numerous, and give the forearm and hand a multitude of movements. The muscles which turn the palm downward are called pronators, the most important of these is the pronator radii teres which runs from the inner part of the lower end of the humerus to the radius. The most important supinator

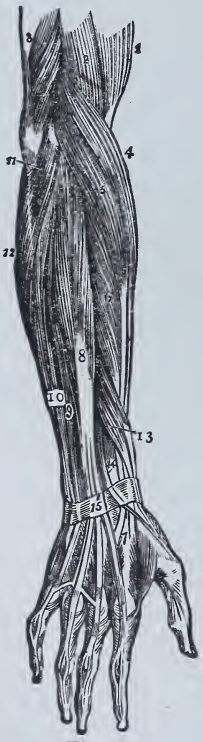

Figure 38.

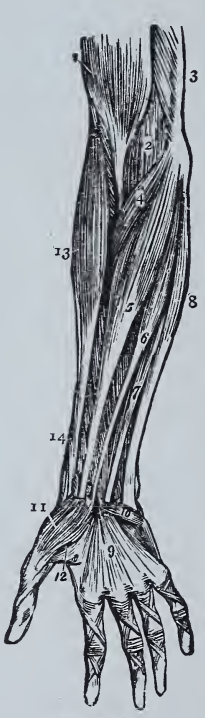

Figure 39.

Figure 38.—MUSCLES OF BACK FOREARM. 1, biceps; 2, brachialis internus; 3, biceps; 4, supinator longus; 5, extensor carpi radialis longior; 6, extensor carpi radialis brevior; 7, insertion of these muscles; 8, extensor communis digitorum; 9, extensor communis digitorum; 10, extensor carpi ulnaris; 11, anconeus; 12, flexor carpi ulnaris; 13, extensor minor pollicis; 14, extensor major pollicis; 15, posterior annular ligament.

Figure 39.—MUSCLES OF FRONT FOREARM. 1, biceps; 2, brachialis internus; 3, triceps; 4, pronator radii teres; 5, flexor carpi radialis; 6, palmaris longus; 7, flexor sublimus digitorum; 8, flexor carpi ulnaris; 9, palmar fascia; 10, palmaris brevis; 11, abductor pollicis; 12, flexor brevis pollicis; 13, supinator longus; 14, extensor ossis metacarpi pollicis.

or muscle which turns the palm upward (Fig. 38), is the supinator longus which runs from the outer part of the lower end of the humerus to the lower end of the radius.

Flexors.—The radial and ulnar flexors (of the wrist) come from the inner part of the arm bone and are inserted into the hand bones. Beneath these muscles lies the flexor sublimus digitorum which divides into four tendons or leaders, one for each finger. These leaders are split so as to give passage to the leaders of the flexor profundus digitorum which are inserted into the ends of the fingers. The thumb is moved by special muscles.

Radial Extensors.—The muscles on the back of the forearm are the longer and shorter radial extensors (of the wrist), which lie behind the long supinator and whose tendons are inserted respectively into the metacarpal bones of the first and second fingers. The ulnar extensor of the wrist lies on the ulnar side of the forearm, and is inserted into the metacarpal bone of the little finger. Between these muscles, in the middle of the forearm (Fig. 39), is the common extensor of the fingers which is inserted by four tendons into the backs of the last two bones of the fingers. The index and little fingers have special extensors. The hand is supplied by a number of short muscles, which give it marvelous dexterity.

MUSCLES OF THE LOWER EXTREMITY.

The muscles of the lower extremity consist of those of the hip, thigh, leg and foot. The psoas magnus and the iliacus, the former from the lumbar vertebræ, the latter from the inside of the ilium, are inserted together into the upper part of the femur. They flex the thigh and roll it outward. The buttocks are composed of the three glutei muscles. They arise from the pelvic bones and are inserted into the upper part of the femur. They extend the hips, raise the body from the stooping posture, and hold the trunk on the thigh bones. Partly beneath them lies a group of muscles (Fig. 41), the rotators of the hip; they are the pyriformis, gemelli, the internal and external obturators, and the quadratus femoris.

Thigh Muscles.—The rectus femoris with the vastus externus and internus form the mass of muscle on the front of the thigh. The rectus arises from the ilium, the vastus from the femur; they join to form a common tendon which is attached to the upper end of the tibia. They extend the leg, flex the thigh, and raise the body from the sitting to the standing posture.

The Tailor's Muscle.—The sartorius, the longest muscle in the body, runs from the ilium downward and inward across the thigh to the inner

side of the shin bone below the knee. It flexes the thigh and crosses the legs.

The biceps femoris arises from the ischium and is inserted into the head of the fibula (Fig. 40). The semimembranosus and the semitendinosus take origin from the ischium and are inserted into the inner part of

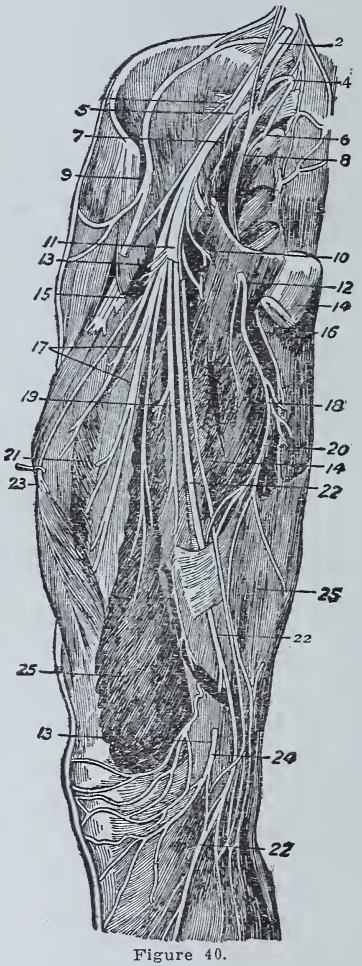

Figure 40.

Figure 40.—NERVES OF THIGH. 1, sympathetic ganglia; 2, third lumbar; 3, branches to iliacus; 4, fourth lumbar; 5, anterior crural; 6, lumbo-sacral; 7, branch to the psoas; 8, obturator; 9, external cutaneous; 10, nerve to pectineus; 11, branch anterior crural; 12, superficial division of obturator; 13, sartorius muscles; 14, adductor longus; 15, branch to rectus; 16, deep division of obturator; 17, branches to vastus externus and crureus; 18, adductor brevis; 19, branch to vastus internus; 20, adductor magnus; 21, vastus externus; 22, internal saphena; 23, rectus femoris; 24, patellar branch of saphena; 25, vastus internus; 26, gracilis.

the head of the tibia. They extend the hips, flex the knee, and raise the body from the stooping position.

Muscles of the Calf.—The calf of the leg is made of the soleus arising from the upper back part of the bones of the leg, and the gastrocnemius, arising from the lower end of the femur; they unite in a common tendon of great size, tendo-achillis, which is attached to the back of the heel bone. They extend the foot and raise the weight of the body in walking and running. Beneath them lie the popliteus and the flexors of the toes corresponding to the flexors of the fingers in the forearm. The extensor

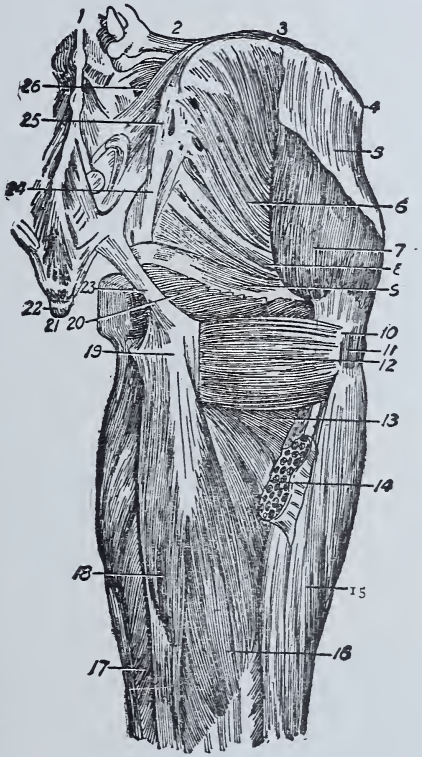

Figure 41.

Figure 42.

Figure 41.—MUSCLES BACK OF THIGH. 1, fifth lumbar vertebra; 2, ilio-lumbar ligaments; 3, crest of ilium; 4, anterior superior spinous process; 5, origin of fascia femoris; 6, gluteus medino: 7, its lower and anterior portion; 8, pyriformis; 9, gemini; 10, trochanter major; 11, insertion gluteus medius; 12, quadratus femoris; 13, adductor magnus; 14, insertion gluteus maximus; 15, vastus extensus; 16, long head biceps; 17, semimembranous; 18, semitendinosus; 19, tuber ischii; 20, obturator internus; 21, point of coccyx; 22, posterior coccygeal ligament; 23, 24, great sacro-sciatic ligament; 25, posterior superior spinous process; 26, posterior sacro-iliac ligaments.

Figure 42.—MUSCLES FRONT OF LEG. 1, tendon of quadriceps; 2, spine tibia; 3, tibialis anticus; 4, extensor communis digitorum; 5, extensor proprius pollicis; 6, peroneus tertius; 7, peroneus longus; 8, peroneus brevis; 9, soleus; 10, gastrocnemius; 11, extensor brevis digitorum.

longus digitorum is attached to the leg bones and to the second and third phalanges (Fig. 42) of the four lesser toes by four tendons. The great

toe has two special flexors and a special extensor and the little toe a special flexor.

On the back of the foot is one muscle only, the extensor brevis digitorum, which assists the long extensor of the toes.

Sole of the Foot.—The sole of the foot, like the palm of the hand, is covered by a dense fibrous sheath, the plantar fascia, running from the heel bone to the metatarsal bones in front; it sustains the arch of the foot, and protects the vessels and nerves beneath. Immediately beneath it lies the flexor brevis digitorum, arising from the heel bone and being inserted into the sides of the second bones of the lesser toes by four tendons which are perforated by the long flexor tendons; and just below this is the flexor accessorius, which is attached to and aids the tendon of the long flexor. There are numerous other small muscles in the foot which give it complicated movements.

THE DIGESTIVE APPARATUS.

What it Consists of.—The digestive apparatus consists of the alimentary or food canal (Fig. 72) which extends from the mouth to the anus and is between twenty and thirty feet in length, and of the various glands which open into it. The alimentary canal is divided into the mouth, pharynx, œsophagus, stomach, small intestine and large intestine. Its function is to digest or convert the food into an assimilable form.

The Mouth.—The mouth is an oval cavity containing the tongue and teeth. In it the food is ground up and mixed with saliva (Fig. 68), which

Figure 68.

Figure 68.—SALIVARY GLANDS. 1, carotid; 2, Steno's duct; 3, submaxillary; 4, its duct; 5, sublingual.

not only moistens it so that it may be readily swallowed but acts on the starchy foods, changing them to sugar. The teeth are described in the chapter on teeth. The saliva is secreted by the parotid glad below and in front of the ear, and by the submaxillary and sublingual glands, which lie in the floor of the mouth.

The Tongue.—The tongue (Fig. 69) is a muscle covered by mucous membrane, containing many mucous glands and little projections called papillæ in which are lodged the ends of the taste nerves. The tongue is the organ of taste, assists in articulation, and aids in mixing the saliva with food and keeping the food between the teeth.

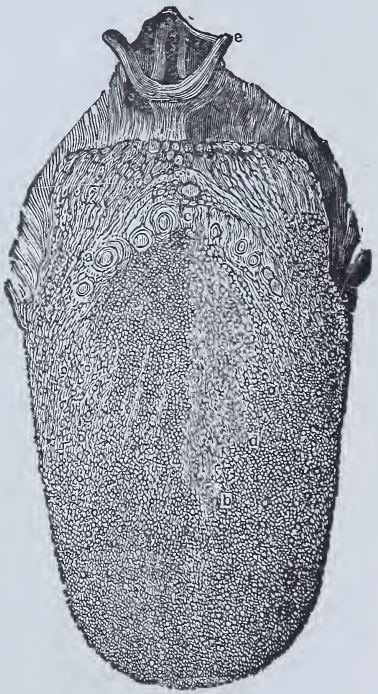

Figure 69.

THE TONGUE.

The Pharynx.—The pharynx is really the upper part of the œsophagus, expanded into a muscular bag. It hangs from the skull above, is four and a half inches long, and communicates with the nose, ear, mouth, œsophagus and larynx.

The Gullet.—The œsophagus or gullet is nine inches long, of same construction as the pharynx, and empties into the stomach. After the food is chewed it is forced into the pharynx which contracts and pushes it down into the œsophagus, which propels it onward to the stomach. During swallowing the opening into the larynx is closed by a little trap door called the epiglottis.

The Stomach.—The stomach (Fig. 70) is roughly pear-shaped; the big end, lying on the left side, measures twelve inches transversely and four inches vertically, is situated just below the diaphragm, receives the œsophagus in its upper left wall (cardiac opening), and empties into the small intestine at the extreme right (pylorus), the opening being guarded by a circular valve reinforced by muscular fibres.

The Stomach Walls.—The stomach wall is made of four layers: externally the peritoneum prevents friction; next is the muscular coat which churns the food, then the cellular coat which carries the blood-vessels,

and internally is the mucous membrane (tripe of cow) containing thousands of little glands (Fig. 71), the peptic or gastric glands, which secrete the gastric juice. When food reaches the stomach, the cardiac orifice and pylorus close, the stomach contracts and mixes it with the gastric juice, which is now freely secreted.

The Gastric Juice.—Gastric juice is made of water, salts, hydrochloric acid and pepsin. It changes albumen to peptone, which is readily ob-

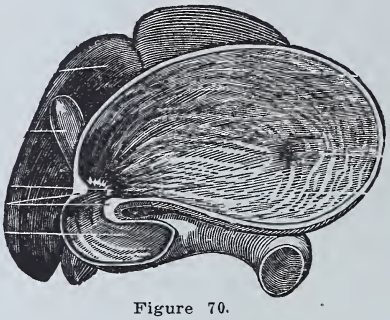

Figure 70.

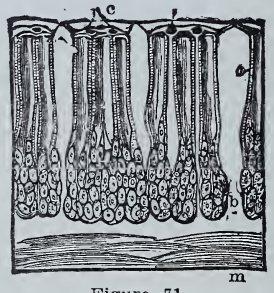

Figure 71.

Figure 70.—STOMACH.
Figure 71.—STOMACH TUBULE. a, neck; b, fundus; c, orifice; m, muscular coat.

sorbed, dissolves the cellulose of vegetable and the fibrous tissue of meats. Water and some of the peptones are absorbed by the stomach. The remaining portion of the food, now a liquid, passes on into the intestines.

Small Intestine.—The small intestine is about twenty feet in length, one inch in diameter, and extends from the stomach to the cecum, into which it empties. It is connected to the spine by a fold of peritoneum, the mensentery, and is contained in the lower and central portion of the abdomen. It is divided, beginning above, into the duodenum, jejunum and ileum.

Duodenum.—Into the duodenum empty the ducts of the liver and pancreas. The small intestine has four coats similar to those of the stomach. In the small intestine the albumens are changed to peptones, fat emulsified, and starches converted into sugars by the action of the bile from the liver, the pancreatic juice and the intestinal juices. The peptones, fat and sugar are absorbed by the intestinal walls and the remaining portion of the food passes into the large intestine, which also absorbs to a slight extent the nutritious portions of its contents, which are now sensusated and are called feces.

Large Intestine.—The large intestine is five feet in length, runs from an enlarged pouch, the cecum, into which the small intestine empties, to the anus. It is about three times as large in calibre as the small intestine. The cecum is situated in the right lower corner of the abdomen, ending

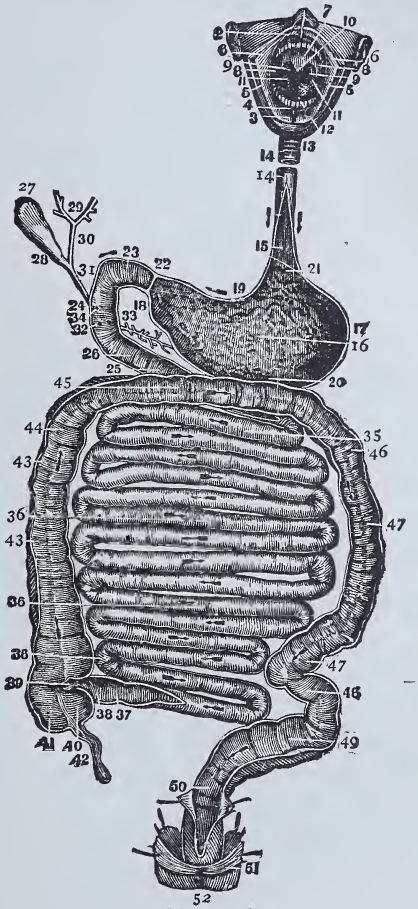

Figure 72.

Figure 72.—ALIMENTARY CANAL. 1, 3, lips; 2, 4, frænum; 5, cheek; 6, Steno's duct; 7, roof of mouth; 8, half arches; 9, tonsils; 10, velum; 11, tongue; 12, papillæ; 13, trachea; 14, œsophagus; 15, its interior; 16, stomach; 17, its greater end; 18, its lesser end; 19, lesser curvature; 20, greater curvature; 21, cardiac orifice; 22, pylorus; 23, 24, 25, duodenum; 26, valvulæ conniventes; 27, gall bladder; 28, cystic duct; 29, 30, hepatic duct; 31, common bile duct; 32, its opening; 33, 35, jejunum; 34, opening of pancreatic duct; 36, 38, ileum; 37, v. conniventes; 39, ileo-cecal valve; 40, 41, cecum; 42, appendix vermiformis; 43-48, colon; 49, 50, rectum; 51, levator ani; 52, anus.

below in the vermiform appendix, which varies from three to six inches in length and is about one-quarter inch in diameter. In the cecum the large intestine ascends to the liver (ascending colon), passes over to the

spleen on the left side (transverse colon), descends on the left side (descending colon) to the pelvis, where it curls like an S (sigmoid flexure) and then ends in the rectum which reaches the surface of the body as the anus. As the feces accumulate in the large intestine they are forced downward to the sigmoid flexure and rectum, where they remain until expelled from the body.

The Sweetbread.—The pancreas (sweetbread) is a long, narrow gland about seven inches in length lying behind the stomach. Its duct opens in common with the bile duct, into the duodenum.

The Liver.—The liver (Fig. 74), the largest gland in the body, weighs about four pounds, and is situated in the upper right corner of the abdomen, where it is retained by the peritoneum which, after forming its outer coat, runs to the abdominal walls as ligaments. It is divided into five lobes, which are made up of lobules, each about one-twentieth of an inch in diameter, between which the vessels and ducts ramify. The bile duct has appended to it a pear-shaped bag, the gall bladder, which, lying on the under surface of the liver, acts as a reservoir for the bile during the intervals of digestion. The bile duct unites with the pancreatic duct and empties into the

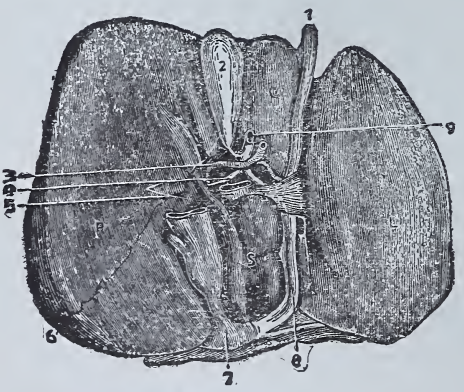

Figure 74.

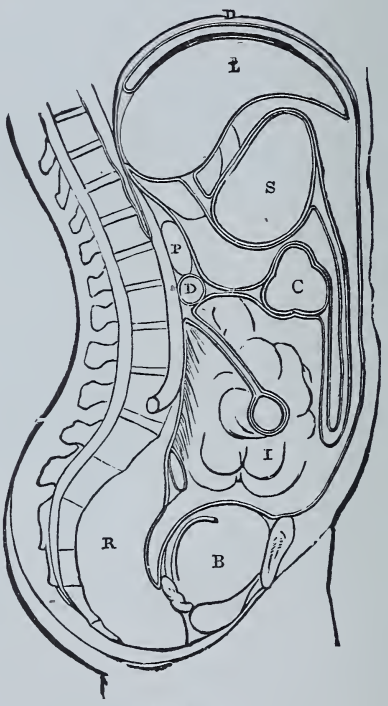

Figure 75.

Figure 74.—LIVER. R, right lobe; L, left lobe; Q, quadrate lobe; S, lobus Spigelli; C, lobus candatus; 1, umbilical vein; 2, gall bladder; 3, hepatic artery; 4, hepatic duct; 5, portal vein; 6, reflexion of peritoneum; 7, vena cava; 8, ductus venosus; 9, common bile duct.

Figure 75.—PERITONEUM. D, diaphragm; L, liver; S, stomach; C, transverse colon; D, transverse duodenum; P, pancreas; I, small intestine; R, rectum; B, bladder.

duodenum. The liver secretes bile, stores up sugar from the blood, helps make blood, destroys poison in the blood and excretes urea and allied products.

Peritoneum.—The peritoneum (Fig. 75) covers all the abdominal organs; it is a serous sac containing a small quantity of fluid which pre-

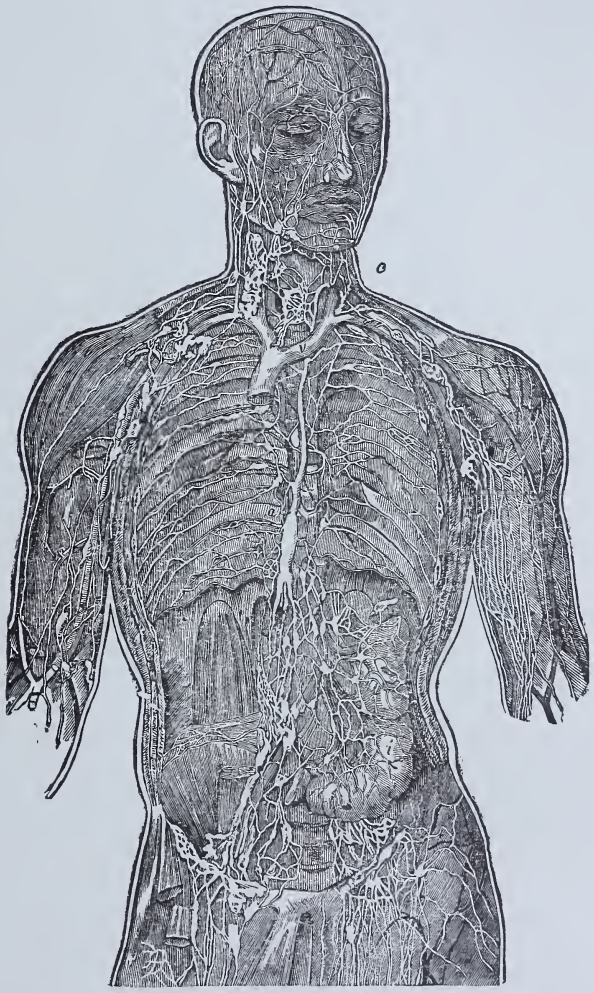

Figure 73.

Figure 73.—LYMPHATICS. a, receptaculum chyli; c, thoracic duct; v, innomonate vein.

vents friction between the organs it covers. The omentum is a double fold of peritoneum, which falls from the front of the stomach nearly to the bladder, then ascends to the transverse colon.

Absorption.—Absorption means the passage of materials from mucous surfaces, serous cavities or tissues into the lymph or blood-vessels.

The Lacteals.—The digested fat in the intestines is absorbed by lymph vessels, called lacteals, because their contents resemble milk. These lacteals converge from various parts of the intestine to form the thoracic duct which passes up and empties into a large vein in the neck. The dilated lower end of the thoracic duct is called the receptaculum chyli. The lymph from the tissue all over the body is collected into the lymphatic

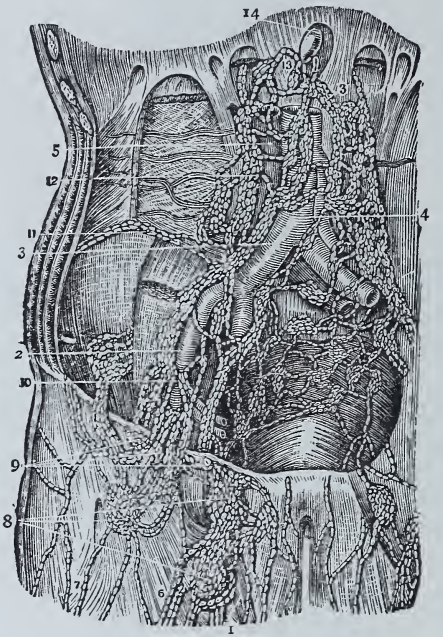

Figure 56.

Figure 56.—LYMPHATICS. 1, saphenous vein; 2, external iliac; 3, common iliac; 4, aorta; 5, ascending vena cava; 6, 7, lymphatics; 8, lower set of inguinal glands; 9, superior set of inguinal glands; 10, chain of lymphatics; 11, lymphatics with circumflex iliac vessels; 12, lumbar and aortic lymphatics; 13, origin thoracic duct; 14, thoracic duct.

vessels (Fig. 56) which, finally by two big trunks, the thoracic duct and the right thoracic duct, into the veins of the neck. On its way to the blood the lymph passes through the lymph glands which frequently swell when any poison passes through them, the kernels felt in the neck during an attach of tonsilitis, for example.

BLOOD—CIRCULATORY SYSTEM.

Composition of Blood.—The blood is made from the food we eat, and it in turn feeds all the tissues of the body and drains away all their waste

products. It consists of liquor sanguinis (liquid of blood) and corpuscles (little bodies), the former containing water, proteids, salts, nutritive and excrementitious matter. The corpuscles (Fig. 54) are red, which are $\frac{1}{3200}$ of an inch in diameter, circular and biconcave, or white, which exist in the proportion of one to three of four hundred reds, are $\frac{1}{2500}$ inch in diameter and possess amœboid motion. When blood is exposed to air it clots, a stringy material proteid in nature, fibrin, which exists in solution in the liquor sanguinis, entangles the corpuscles, forming a semisolid mass.

Figure 54.—BLOOD CORPUSCLES.

Function of Corpuscles.—Blood corpuscles carry oxygen from the lungs to the tissues and the liquor sanguinis carries food; the blood drains carbon dioxide and other waste products from the tissues to the excretory organs: skin, kidney, liver and lungs.

Circulatory Apparatus.—The blood is carried to and from the tissues by the circulatory apparatus, which consists of the heart, arteries, capillaries and veins. The heart pumps the blood through the arteries to the thin-walled capillaries where the food passes out to the tissues and waste is given to the blood; from the capillaries the blood drains into the veins which run to the heart. The heart then sends the blood to the lungs to be purified, to the intestines for food and again pumps it out to the tissues.

The Heart.—The heart is a hollow muscular organ of conical form, placed in the chest between the lungs and inclosed in a serous sac, the pericardium. It is placed obliquely; the base, to which is attached the great vessels, is directed upward and backward; the apex is directed downward and to the left, and corresponds to the interval between the fifth and sixth ribs, one inch to the inner side and two inches below the nipple.

In a grown person (Fig. 51) the heart is about five inches in length, three and a half inches in breadth at its broadest part and two and a half inches thick. In the male it weighs from ten to twelve ounces and in the female about two ounces less.

Heart Divisions.—The heart is divided longitudinally by a muscular partition into two halves and a transverse partition divides these halves into two cavities. The lower cavities are called ventricles and the upper ones auricles. The walls of the auricles are thinner than those of the ventricles and the walls of the right side of the heart are thinner than those of the left.

Right Auricle.—The right auricle receives the blood from the two main veins of the body—the two vena cava. From the auricle the blood is forced into the right ventricle through the auriculo-ventricular orifice. This opening is guarded by the tricuspid valve, to prevent the reflux of blood into the auricle when the ventricle contracts. This valve is com-

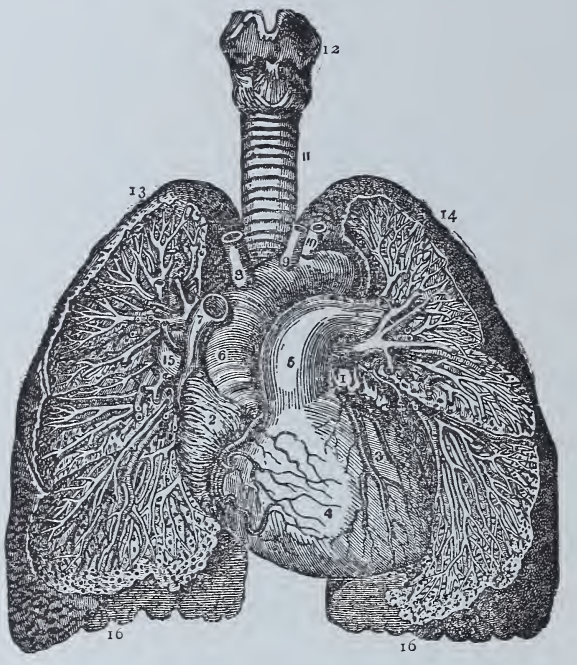

Figure 51.

Figure 51.—HEART AND LUNGS. 1, left auricle; 2, right auricle; 3, left ventricle; 4, right ventricle; 5, pulmonary artery; 6, arch of aorta; 7, superior vena cava; 8, innominate artery; 9, common carotid; 10, subclavian; 11, trachea; 12, larynx; 13, upper lobe right lung; 14, upper lobe left lung; 15, right pulmonary artery; 16, lower lobes of lungs.

posed of three segments, to the free margin of which are attached tendinous cords, which, springing from the muscular ridges projecting from the inner surface of the ventricle, the columnæ carneæ, give support to the valves.

Right Ventricle.—The walls of the right ventricle (Fig. 52) are about one-third as thick as those of the left ventricle. Beside the opening into the auricle there is the opening into the pulmonary artery which is guarded by the semilunar valves, three semicircular folds of the lining membrane of the heart.

Course of the Blood.—The blood is forced from the right ventricle through the pulmonary artery to the lungs, the semilunar valves closing after each contraction of the ventricle so preventing any backward flow.

Left Auricle.—The left auricle is smaller than the right, but thicker; it receives the blood which returns from the lungs by the pulmonary veins and forces it into the left ventricle through an opening, guarded by

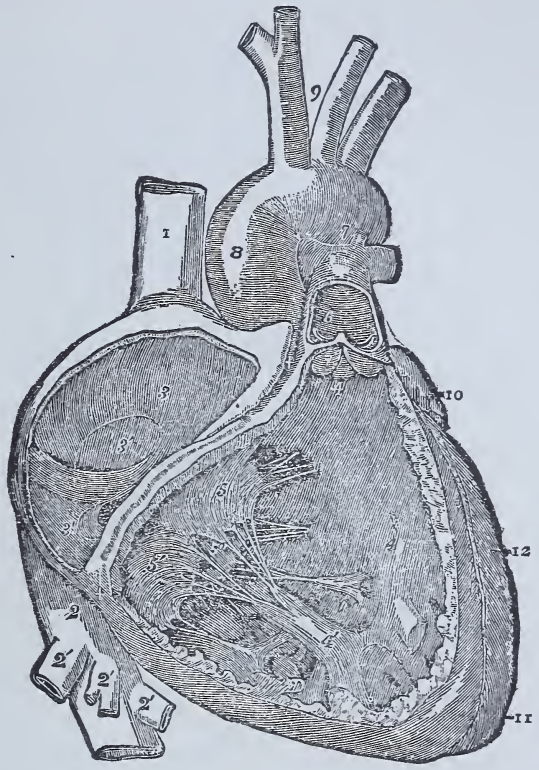

Figure 52.

Figure 52.—HEART. 1, superior vena cava; 2, inferior vena cava; 2′, hepatic veins; 3, right auricle; 3′, fossa ovalis; 3″, aperture coronary vein; +, +, in auricula-ventricular groove; 4, 4, cavity right ventricle; 4′, columnæ carnæ; 5′, 5″, tricuspid valve; 6, pulmonary artery; 7, concavity aortic arch; 8, ascending aorta; 9, between innominate and left carotid; 10, auricular appendage; 11, 11, left ventricle.

valves, similar to the right auriculo-ventricular orifice, except that the valve, called the mitral valve, has but two segments.

Left Ventricle.—The left ventricle is the thickest and strongest portion of the heart. The blood received by it through the auriculo-ventricular orifice is discharged into the main artery of the body, the aorta, through an opening which is guarded by semilunar valves (Fig. 53) as in the case of the pulmonary artery. The cavities of the heart are lined by a delicate endothelium, which is continuous with that of the blood-vessels.

Pulsation.—The heart pulsates from seventy-five to eighty times per minute in the adult; in childhood it is more rapid. The strength and rapidity are governed by the nerves which supply the heart with force.

Heart Sound.—Upon listening to the heart two sounds are heard. The first sound, dull and heavy, is caused by the contraction of the heart, the shutting of the auriculo-ventricular valves and the rush of blood. The second sound, sharp in character, is due to the snapping shut of the semilunar valves.

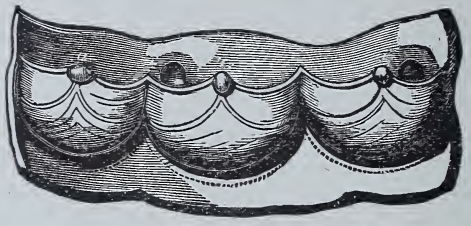

Figure 53.—SEMILUNAR VALVES.

ARTERIES.

Function of Arteries.—The arteries carry the blood from the heart to all parts of the body. It has three coats, an outer areolar elastic coat, a middle muscular coat and an inner endothelial coat.

The Aorta.—The main artery of the body is called the aorta (Fig. 43). It springs from the left ventricle, runs up toward the neck, then turns and descends along the spine and divides in the lower abdomen into the two common iliac arteries.

Coronary Arteries.—Just after leaving the heart it sends the two coronary arteries to the heart muscle. Then as it arches through the chest it gives off on the right side the innominate artery and on the left side the left common carotid and the left subclavian arteries. The innominate divides into the right common carotid and subclavian arteries.

Cardiacs.—The carotids (Fig. 44) run up the neck to the top of the larynx where they divide into the external carotid which supplies the outside of the head and the internal carotid which supplies the brain, ear and eye.

Subclavian.—The subclavian (Fig. 45) supplies the chest, neck and upper extremity; when it reaches the armpit it is called the axillary artery and in the arm it is called the brachial. This trunk, called subclavian axillary and brachial, according to its situation, gives off numerous branches to the various structures of the shoulder and arm. At the elbow it divides into the radial and ulnar branches. The brachial lies on the inner, protected side of the arm just beneath the biceps muscle. It is important to know its location when making pressure to stop hemorrhage lower down the arm.

Radial Artery.—The radial artery (Fig. 46) from the bend of the elbow down the radial side of the arm to the wrist, where it is frequently

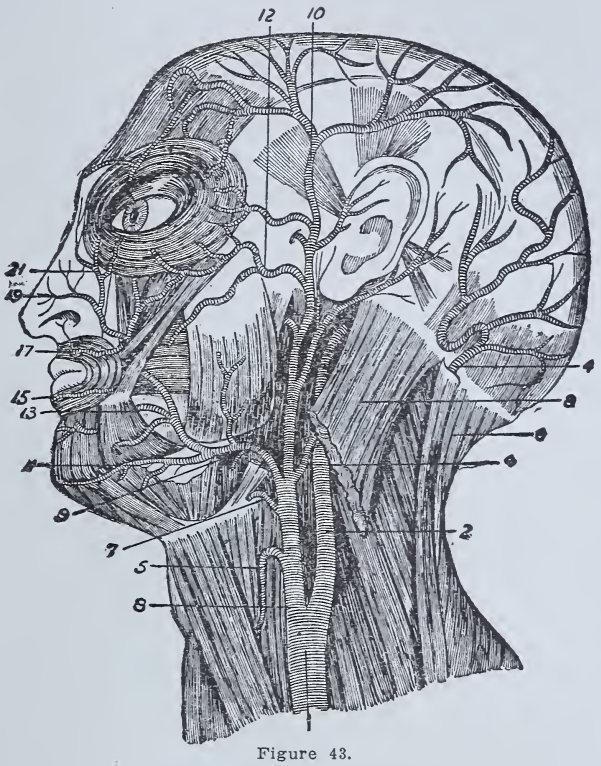

Figure 43.

Figure 43.—ARTERIES OF HEAD. 1, common carotid; 2, internal carotid; 3, external carotid; 4, occipital; 5, superior thyroid; 6, trapezius; 7, lingual; 8, sterno-mastoid; 9, facial; 10, temporal; 11, submental; 12, transverse facial; 13, inferior labial; 15, inferior coronary; 17, superior coronary; 19, lateral nasal; 21, angular.

felt to determine the character of the pulse; it then winds around the base of the thumb, enters the palm between the thumb and metacarpal bone of the index finger and forms an arch (deep palmar arch), which sends branch to the thumb, index finger and palm.

Ulnar Artery.—The ulnar artery, larger than the radial, passes down the inner side of the forearm, giving off branches to the muscles. In the palm it also describes an arch (superficial palmar arch) which sends branches to the fingers.

Thoracic Aorta.—The portion of the aorta in the thorax is called the thoracic aorta, that in the abdomen the abdominal aorta. The thoracic

aorta supples the pericardium, lungs, œsophagus and intercostal structures with nourishment.

Abdominal Aorta.—The abdominal aorta (Fig. 47) supplies the diaphragm, stomach, liver, spleen, intestines, kidneys, ovary or testicle and muscles of the abdominal wall by branches whose names correspond to the organ it supplies.

Common Iliacs.—Opposite the fourth lumbar vertebræ the aorta divides into the two common iliacs, short trunks which again divide into the internal and external iliac arteries, giving off no branches.

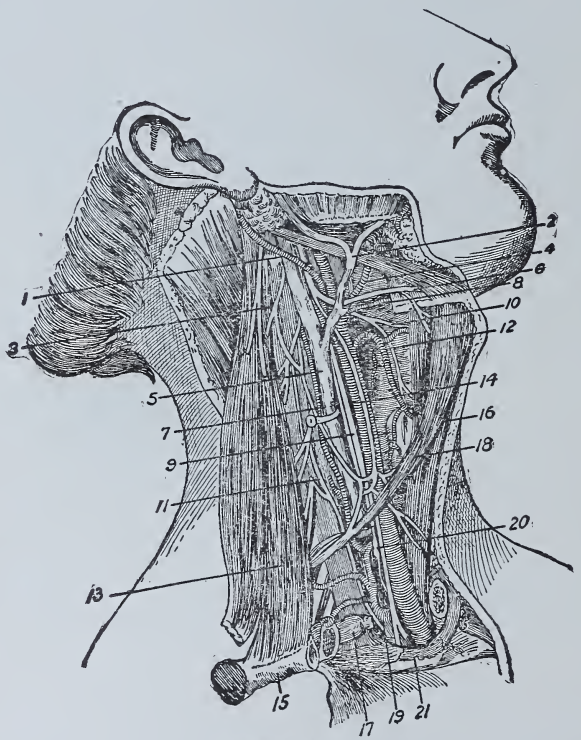

Figure 44.

Figure 44.—ARTERIES OF NECK. 1, occipital artery; 2, facial vein; 3, spinal accessory nerve; 4, facial artery; 5, internal jugular vein; 6, hypoglossal nerve; 7, communicans noni nerve; 8, lingual artery; 9, pneumogastric; 10, superior laryngeal nerve; 11, phrenio; 12, superior thyroid artery; 13, sterno-mastoid; 14, common carotid; 15, clavicle; 16, sterno-hyoid; 17, subclavian; 18, omo-hyoid; 19, subclavian; 20, sympathetic ganglia; 21, apex lung.

The internal iliac dips into the pelvic cavity and divides into two trunks; the anterior gives off branches to the bladder, rectum, anus, genital organs, buttocks and upper part of the thigh; the posterior trunk sends branches to the buttocks, sacrum and muscles in the pelvis.

External Iliac.—The external iliac (Fig. 48) runs across the pelvis and escaping below Poupart's ligament is continued down the thigh as

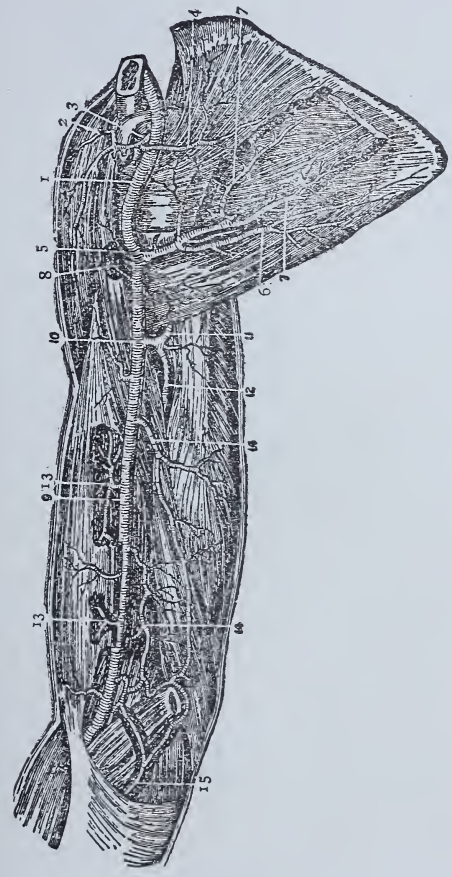

Figure 45.

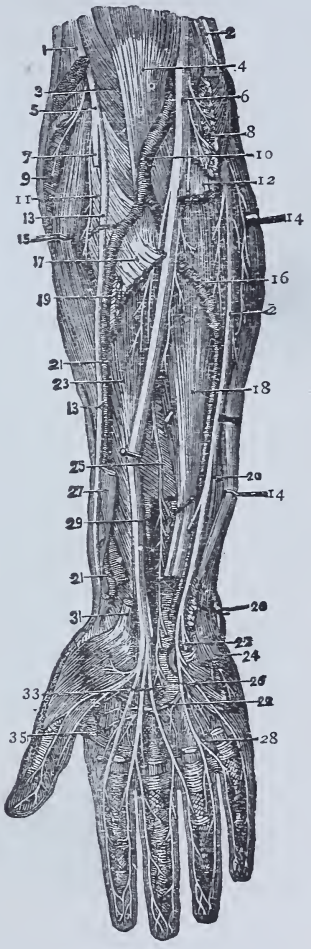

Figure 46.

Figure 45.—ARTERIES OF ARM. 1, axillary artery; 2, thoracica acromialis; 3, superior thoracic; 4, subscapular; 5, inferior scapular; 6, 7, branches to the teres and subscapularis; 8, anterior circumflex; 9, brachial; 10, profunda; 11, posterior circumflex; 12, profunda; 13, muscular branches; 14, branches to brachialis internus; 15, recurrent ulnar.

Figure 46.—DEEP DISSECTION FRONT OF FOREARM. 1, supinator longus; 2, ulnar nerve; 3, brachialis anticus; 4, biceps; 5, musculo-spiral; 6, median nerve; 7, posterior interosseous nerve; 8, pronator teres and flexor carpi radialis; 9, extensor carpi radialis longior; 10, brachial artery; 11, supinator brevis; 12, flexor sublimus digitorum; 13, 13, radial nerve; 14, flexor carpi ulnaris; 15, extensor carpi radialis brevior; 16, ulnar artery; 17, radial origin of flexor sublimus digitorum; 18, flexor profundus digitorum; 19, pronator teres; 20, dorsal branch ulnar nerve; 21, radial artery; 22, deep branch ulnar nerve; 23, flexor longus pollicis; 24, abductor minimi digiti; 25, anterior interosseous nerve; 26, digital branches of ulnar nerve; 27, supinator longus; 28, one of lumbricales; 29, pronator quadratus; 31, flexor carpi radialis; 33, digital branches median nerve; 35, abductor pollicis.

the femoral artery. It gives off two large branches to the muscles of the belly.

Femoral Artery.—The femoral artery runs a straight course down the thigh from the middle of the groin to the lower third of the femur, where

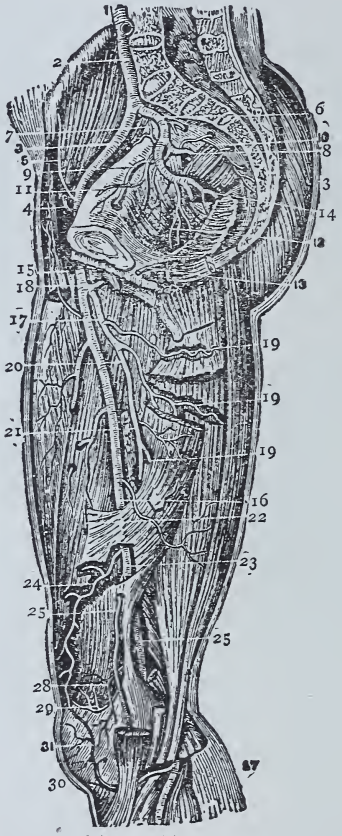

Figure 47.

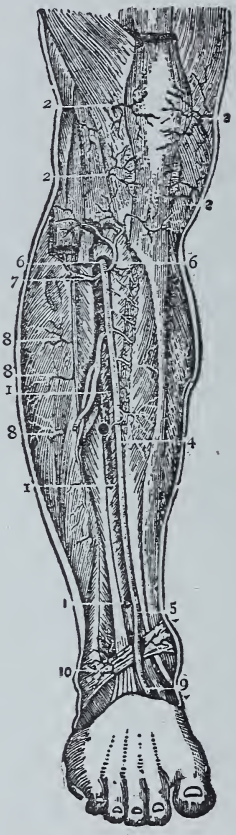

Figure 48.

Figure 47.—ARTERIES OF THIGH. 1, aorta; 2, common iliac; 3, external iliac; 4, epigastric; 5, circumflex iliac; 6, internal iliac; 7, ilio-lumbar; 8, gluteal; 9, obturator; 10, lateral sacral; 11, vesical arteries; 12, middle hemorrhoidal; 13, internal pudic; 14, ischiatic; 15, femoral; 16, foramen for femoral; 17, profunda; 18, internal circumflex.

Figure 48.—ARTERIES OF LEG. 1, extensor proprius pollicis; 2, articular arteries; 3, anterior tibia; 4, 5, same artery; 6, recurrent branch; 7, 8, muscular branches; 9, dorsalis pedis; 10, external malleolar artery.

it passes through an opening in the muscles and becomes the popliteal. After giving off several small vessels to the muscles of the thigh it sends out a large trunk, the profunda, which gives off two, the circumflex and three perforating branches, which supply the muscles.

Popliteal Artery.—The popliteal is the continuation of the femoral running in the hollow behind the knee joint, dividing just below the knee joint into the anterior and posterior tibial arteries.

Anterior Tibial.—The anterior tibial passes forward between the bones of the leg at its upper part, passes down the front of the leg, and on the front of the foot, becomes the dorsalis pedis.

Dorsalis Pedis.—The dorsalis pedis runs along the back of the foot and terminates in the artery of the great toe; it gives off branches to the tarsus and metatarsus, the latter forming an arch and giving branches to the toes.

Posterior Tibial.—The posterior tibial descends along the inside of the back of the leg to the hollow behind the inner ankle, where it divides into the two plantar arteries. It gives branches to the muscles of the leg, tibia and ankle.

Plantars.—The internal and external plantar arteries crossing the foot form an arch, from which branches are given to the toes, in a manner analagous to those in the hand.

Pulmonary Artery.—From the right ventricle of the heart arises the pulmonary artery, which conveys the impure blood to the lungs to be purified.

THE VEINS.

Vein Function.—After the blood flows through the capillaries it is collected by the veins, which are made by small branches joining to form larger branches and these again joining larger trunks, and so on.

Vein Structure.—The veins have three coats, like the arteries, but are thinner, less elastic, and when empty collapse. They have valves at intervals to prevent the backward flow of blood.

Jugular Vein.—The small veins of the exterior of the head follow the arteries and have similar names. They empty into the external jugular which runs down the neck and empties into the subclavian vein.

Internal Jugular.—The internal jugular receives the veins from the interior of the cranium, passes down the neck with the carotid artery and unites with the subclavian vein to form the innominate vein.

Innominate Veins.—The two innominate veins are in the chest and join to become the superior vena cava.

Veins of Upper Extremity.—The veins of the upper extremity (Fig. 49) besides those accompanying are a radial, an anterior and posterior ulnar and a median vein. They collect the blood from the hand and forearm, and just above the bend of the elbow the ulnar veins unite to form joint into the anterior and posterior tibial arteries.

the basilic vein, which passes up the inner side of the arm and empties into the axillary vein.

Radial Vein.—The radial vein forms the cephalic, which passes up the

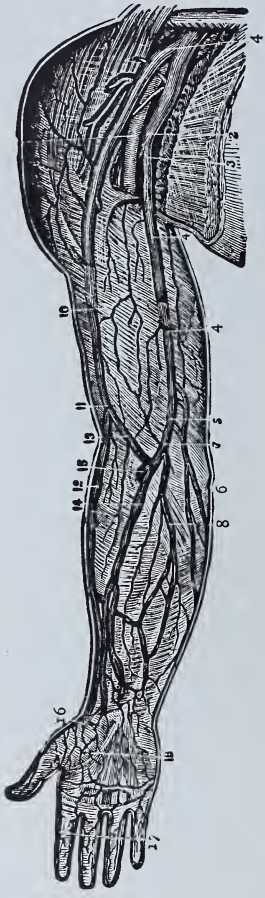

Figure 49.

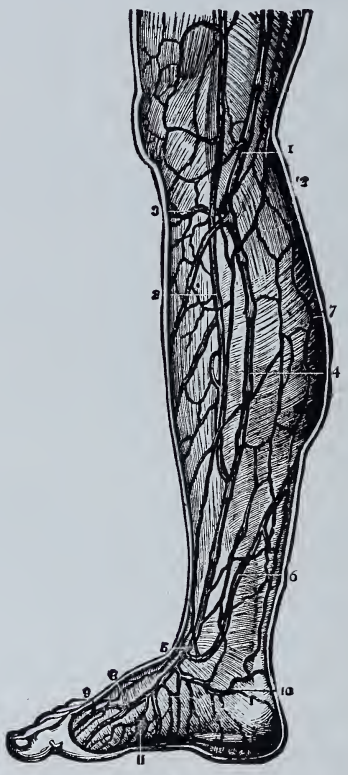

Figure 50.

Figure 49.—VEINS OF UPPER EXTREMITY. 1, axillary artery; 2, axillary veins; 3, 4, basilic; 5, point where median basilic joins basilic; 6, posterior basilic vein; 8, anterior basilic vein; 9, point where cephalic enters axillary; 10, portion same vein; 11, point where median cephalic enters cephalic; 12, lower portion cephalic vein; 13, median cephalic vein; 14, median vein; 15, anastomosing branch; 16, cephalica-pollicis veins; 17, veins of fingers; 18, palmar veins.

Figure 50.—VEINS OF LEG. 1, saphenous; 2, collateral branch; 3, anastomosis; 4, internal saphenous; 5, origin of saphenous; 6, anastomosing branch; 7, branches on back leg; 8, internal vein of foot; 9, arch veins on metatarsal bones; 10, branch from heel; 11, branches on sole of foot.

outside of the arm and winding around the shoulder-joint empties into the axillary vein.

Median Vein.—Below the bend of the elbow the median and a branch from the deep veins empty into a large V-shaped vein; running from its

apex into which these veins empty it unites together the basilic and cephalic veins, one arm being called the median basilic and the other the median cephalic.

Axillary Vein.—The axillary vein, in the armpit, runs up to form the subclavian which joins the internal jugular to form the innominate.

The internal saphenous vein (Fig. 50) commences on the back of the foot, and running straight up the inner side of the leg and thigh joins the femoral vein just below Poupart's ligament.

Saphenous Vein.—The external or short saphenous vein begins at the outer side of the foot, runs up the middle of the calf of the leg and empties into the popliteal vein.

The deep veins follow the arteries and have similar names.

Femoral Vein.—The femoral vein receives all the veinous blood from the leg, runs with the femoral artery into the abdomen, becomes the external iliac which joins with the internal iliac to form the common iliac. The two common iliacs join to form the inferior vena cava which runs up the spine and empties into the right auricle, receiving in its course the various abdominal veins.

Portal Vein.—The veins from the stomach, spleen and intestines are collected into a short trunk, the portal vein, which enters the liver. The blood from the liver is collected by the hepatic vein, which empties into the inferior vena cava.

Pulmonary Veins.—The four pulmonary veins start as capillaries in the walls of the air cells of the lungs, carry pure blood and empty into the right auricle.

RESPIRATORY APPARATUS.

In order to reach the lungs air passes through the nose, pharynx, larynx and trachea, which warm it and filter it of impurities.

The Larynx.—The larynx (Adam's apple) is the organ (Fig. 55) of voice, and will be described in connection with disease of the throat.

Windpipe.—The trachea (windpipe) is made of rings of cartilage, joined by connective tissue. It is five inches long and lies just beneath the skin of the neck until it enters the chest, where it divides into the two bronchial tubes, one going to each lung. These divide and subdivide into numerous branches.

The Lungs.—The lungs are conical, slate colored in adult life and are separated in the middle of the thorax by the heart, gullet and great blood-vessels. The outer surface of the lungs is convex and smooth, the inner surface concave. Above it extends into the neck, below it rests

upon the diaphragm. The right lung is the larger and is divided into three lobes, the left into two.

Lung Lobes.—Each lobe is made of little lobules which consist of a little ramification of a bronchial tube communicating with air cells.

Lung Membrane.—The surface of the lung is covered by a smooth serous membrane, the pleura, which is reflected upon the walls of the

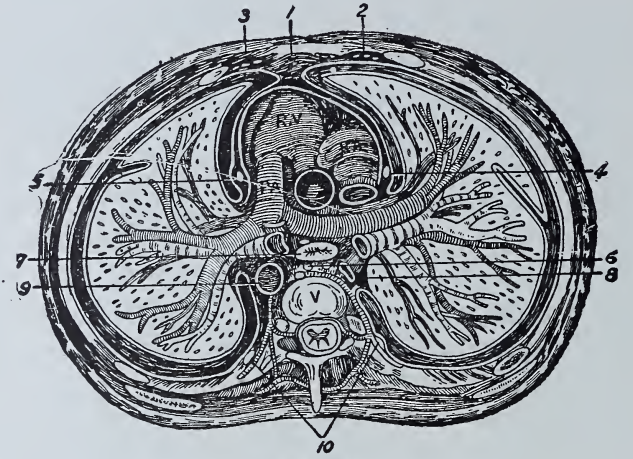

Figure 55.

Figure 55.—TRANSVERSE SECTION THORAX. 1, anterior mediastinum; 2, internal mammary vessels; 3, triangularis sterni; 4, 5, phrenic nerves; 6, thoracic duct; 7, œsophagus; 8, vena azygos major; 9, thoracic aorta; 10, sympathetic; R. V., right ventricle; R. A., right auricle; P. A., pulmonary artery; A., aorta; C., superior vena cava; V., dorsal vertebra.

chest; the intervening space contains a small quantity of fluid which prevents friction during the respiratory movements.

Breathing.—When the chest is enlarged by elevation of the ribs and descent of the diaphragm the lungs follow the chest wall and expand, air rushing into them. When the muscles relax the elastic and over-distended lungs discharge the air through the windpipe.

Air Vesicles.—In the air vesicles the blood is separated from the air by a very thin partition through which oxygen passes to the blood corpuscles. The expired air contains the carbon dioxide and other impurities with which it has been charged while in the air vesicles.

Oxygenized Blood.—The blood, after passing through the lungs, is a brighter red, richer in oxygen, cooler and is rid of its impurities.

NERVOUS SYSTEM.

Function of Nerves.—The nervous system presides over all functions and harmonizes them. It permits the environs to be recognizable. It

may be compared to a telegraph system, of which the brain is the central station, to a rider on a horse, or to the captain of a steamship. It is divided into the cerebro-spinal system (brain and spinal cord with their nerves) which presides over the animal functions, motion, sensation, etc., and the sympathetic system which controls the organic functions, nutrition, growth, etc. The sympathetic system is composed of a series of ganglia (large mass nerve cells) in the head and along the front of the spine, connected by nervous cords.

The Brain.—The brain is a huge mass of white and gray nervous matter contained in and protected by the cranium. It is surrounded by

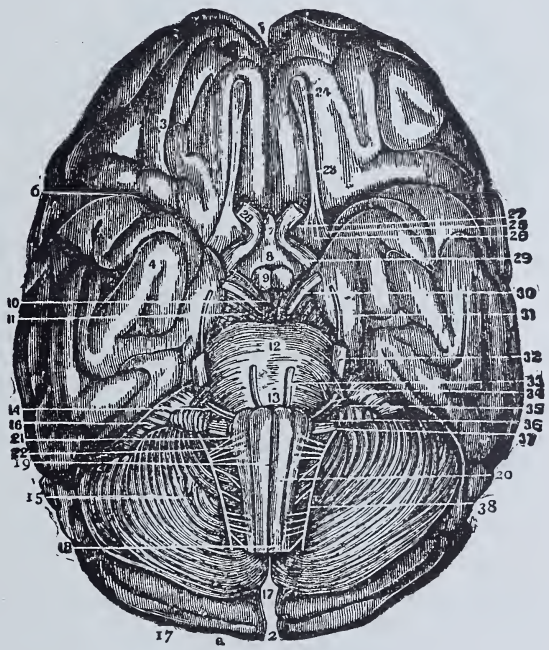

Figure 61.

Figure 61.—BASE OF BRAIN. 1, 2, longitudinal fissure; 3, anterior lobes cerebrum; 4, middle lobe; 5, fissure Sylvius; 6, posterior lobe; 7, infundibulum; 8, its body; 9, corporo albicantia; 10, cineritious matter; 11, crura cerebri; 12, pons Varolii; 13, medulla oblongata; 14, posterior prolongation of pons; 15, middle of cerebellum; 16, anterior part of cerebellum; 17, its posterior part and fissure; 18, medulla spinalis; 19, middle fissure medulla; 20, pyramidal body; 21, retiform body; 22, olivary body; 23, olfactory nerve; 24, its bulb; 25, its external root; 26, middle root; 27, internal root; 28, 29, optic nerve; 30, third nerve; 31, fourth nerve; 32, fifth nerve; 33, sixth nerve; 34, facial nerve; 35, auditory nerve; 36, 37, 38, eighth nerve.

three membranes (meninges): the dura mater, externally, dipping into the fissures to form the falx cerebri, tentorium cerebelli and falx cerebelli which separate and support portions of the brain; the arachnoid,

the serous membrane, supplying a fluid which acts as a water cushion for the brain; and the pia mater, the layer carrying the blood-vessels.

Weight of Brain.—The average weight of the brain is fifty ounces in males, and six ounces less in females.

Divisions of Brain.—The brain is divided into the cerebrum, cerebellum, pons varolii and medulla oblongata.

The Cerebrum.—The cerebrum is the largest part of the brain, resting on the roof of the orbit, base of skull, and tentorium cerebelli. It is

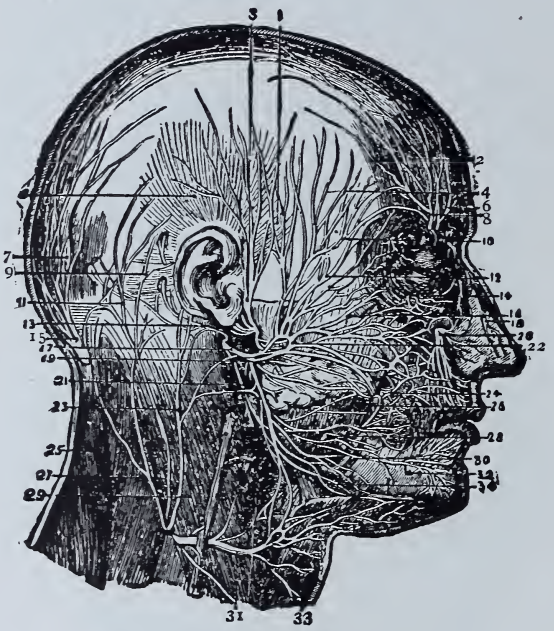

Figure 62.

Figure 62.—NERVES OF FACE AND SCALP. 1, attrahens aurem; 2, anterior belly occipito-frontalis; 3, auriculo-temporal nerve; 4, temporal branches of facial nerve; 5, attolens aurem; 6, supra-trochlear; 7, posterior belly occipito-frontalis; 8, supra-orbital; 9, retrahens aurem; 10, temporal branch of orbital nerve; 11, small occipital nerve; 12, malar branches of facial nerve; 13, posterior auricular nerve; 14, malar branch of orbital; 15, great occipital; 16, infra-orbital branches; 17, facial nerve; 18, nasal nerve; 19, cervico-facial division of facial; 20, infra-orbital nerve; 21, branches to digastric and stylo-hyoid; 22, temporo-facial division of facial; 23, great auricular; 24, buccal branches of facial; 25, trapezius; 26, buccinator nerve; 27, splenius capitis; 28, masseter; 29, sterno-mastoid; 30, supra-maxillary branches of facial nerve; 31, superficial cervical nerve; 32, mental nerve; 33, platysma; 34, infra-maxillary branches of facial nerve.

divided into lateral halves by the falx cerebri. The halves are joined by the corpus callosum. Internally it is composed of white, and externally of gray, nervous tissue. The gray tissue is wrinkled into convolution and is the active portion of the brain, the white matter conducting the nerve impulses to and from it. It is the seat of memory, intelligence, reason, will, motion and sensation.

The Cerebellum.—The cerebellum lies beneath the posterior portion of the cerebrum, is gray outside and white inside. It coördinates muscular movements.

The pons varolii connects the various parts of the brain. It conducts impulses to and from the brain.

Medulla Oblongata.—The medulla oblongata is the enlarged upper end of the spinal cord resting in the cranium. It is made of blended white and gray tissue, conducts the nerves from the brain to the spinal cord and contains independent nervous centres which regulate the heart, lungs, blood-vessels, sweating, etc.

Nerves of Brain.—The brain gives off twelve nerves on each side. The nerves pass out through holes (foramen) in the skull and supply the organs of sight, smell, taste and hearing, and also motion and sensation to certain parts. They are: the olfactory (smell), optic (sight), motor oculi (motion to eye), patheticus (motion to superior oblique muscle of eye),

Figure 63.

Figure 63.—FIFTH NERVE. 1, orbit; 2, antrum of Highmore; 3, tongue; 4, lower jaw; 5, Gasserian ganglion; 6, first branch of fifth; 7, second; 8, third; 9, frontal branch; 10, lacrymal branch; 11, nasal branch; 12, internal nasal nerve; 13, external nasal; 14, external and internal frontal nerve; 15, infra-orbital; 16, posterior dental branches; 17, middle dental; 18, anterior dental; 19, terminating branches infra-orbital nerve; 20, orbital branch; 21, ptyregoid nerve; 22, five anterior branches; 23, lingual branch; 24, inferior dental; 25, mental branches; 26, superficial temporal nerve; 27, auricular branches; 28, mylo-hyoid.

trifacial (sensation to face, motion to chewing muscles and nerve of taste), abduces (rolls eye out), facial (motion to face), auditory (hearing), glosso-pharyngeal (taste and sensation), pneumogastric (presides over

swallowing, heart, lungs, etc.), spinal accessory (motion to muscles, neck and back) and the hypoglossal (motion to tongue).

Spinal Cord.—The spinal cord is a long tail hanging from the back

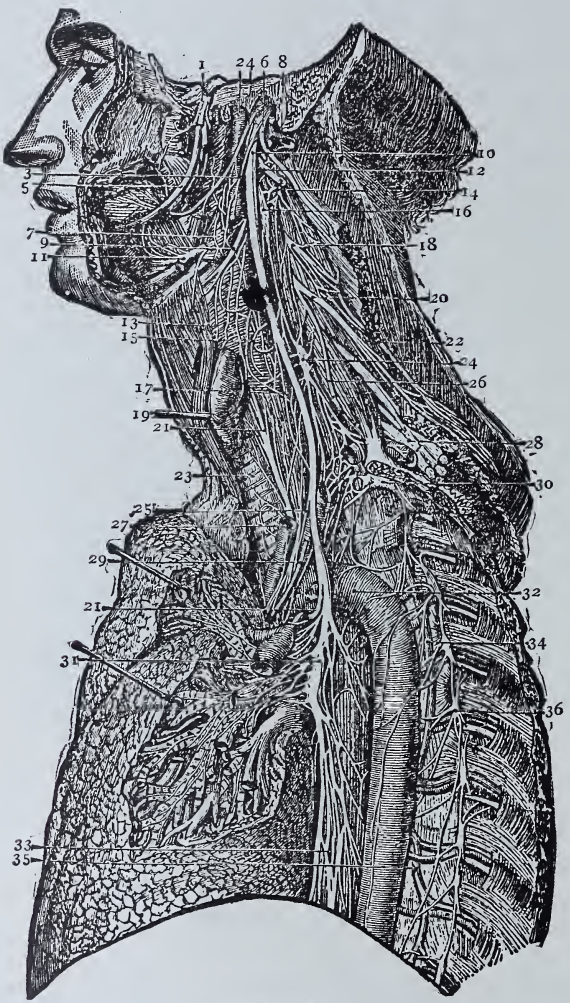

Figure 64.

Figure 64.—NINTH, TENTH AND ELEVENTH NERVES. 1, Gasserian ganglion; 2, internal carotid; 3, pharyngeal branch of pneumogastric; 4, glosso-pharyngeal; 5, lingual; 6, spinal accessory; 7, middle constrictor of pharynx; 8, internal jugular vein; 9, superior laryngeal nerve; 10, ganglion of pneumogastric; 11, hypoglossal; 12, ditto communicating with eighth and first cervical; 13, external laryngeal; 14, second cervical; 15, pharyngeal plexus; 16, superior cervical ganglion; 17, superior cardiac nerve; 18, third cervical; 19, thyroid body; 20, fourth cervical; 21, recurrent laryngeal; 22, spinal accessory; 23, trachea; 24, middle cervical ganglion; 25, middle cardiac nerve; 26, phrenic; 27, left carotid; 28, brachial plexus; 29, phrenic; 30, inferior cervical ganglion; 31, pulmonary plexus; 32, aorta; 33, œsophageal plexus; 34, vena azygos superior; 35, vena azygos minor; 36, ganglia ted cord of sympathetic.

of the brain and contained in the spinal canal. It is sixteen to eighteen inches long and surrounded by three membranes like the brain.

Upper Section.—Upon section the cord (Fig. 59) is seen to be composed externally of white nervous tissue, and internally of the gray, which is arranged somewhat in the shape of the letter H. The cord is divided by two antero-posterior fissures into two equal lateral halves, which are united in the centre by a bridge of gray matter.

The spinal cord is a great nerve cable carrying fibres to and from the brain; it also coördinates motion, presides over the nutrition of certain parts and contains independent nervous centre.

From the anterior horn of the gray matter arises the motor roots of the spinal nerves and from the posterior horn the sensory roots.

Spinal Nerves.—Each spinal nerve, of which there are thirty-one pairs, consists of the anterior or motor and the posterior or sensory root. These unite within the spinal canal and form a single cord (Fig. 65), which passes through the opening between the vertebræ and divides into two trunks, one for the anterior and the other for the posterior surface of the body.

Cervical Plexus.—The anterior branches of the four upper cervical nerves unite with each other to form the cervical plexus which gives off branches to the side of the head, neck, shoulder, chest and diaphragm. The anterior branches of the fifth, sixth and seventh cervical nerves unite, the fifth receiving a branch from the fourth; the eighth cervical and first dorsal nerves unite; these cords form the brachial plexus, and after sending nerve trunks to the muscles of the neck and sides of the chest below the collar bone, these two trunks each send off a trunk which unite to form a third or posterior trunk

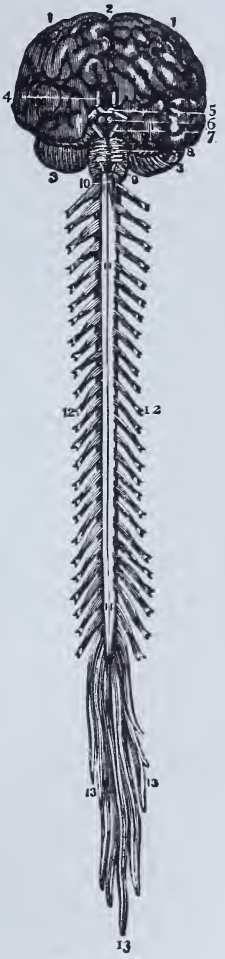

Figure 59.

Figure 59.—BRAIN and CORD. 1, 1, hemispheres of cerebrum; 2, great middle fissure; 3, cerebellum; 4, olfactory nerves; 5, optic nerves; 6, corpora albicanlia; 7, motor oculi; 8, pons Varolii; 9, fourth nerve; 10, medula oblongata; 11, 11, medula spinalis; 12, 12, spinal nerves; 13, cauda equina.

which divides into two branches, supplying the muscles and skin of the outside and back of the arm, forearm and hand.

Inner and Outer Trunks.—The inner and outer trunks are continued down the inside of the arm, and again each sends a branch to form a

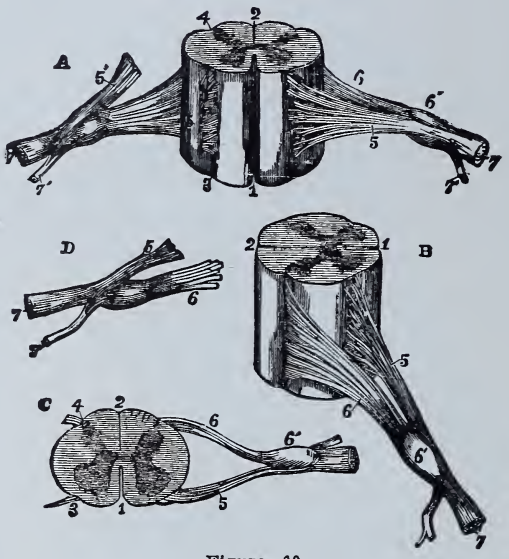

Figure 60.

Figure 60.—VIEWS OF SECTION OF CERVICAL CORD. A, anterior surface; B, right side; C, upper surface; D, nerve roots; 1, anterior median fissure; 2, posterior median fissure; 3, anterior lateral depression; 4, posterior lateral groove; 5, anterior roots; 6, posterior roots; 6′, ganglion; 7, spinal nerve; 7′, posterior branch.

middle cord, the median nerve. The external cord then becomes the musculo-cutaneous, and the internal, the ulnar.

Median Nerve.—The median nerve (Fig. 66) gives off branches to the muscles and to the skin of the hand. The ulnar nerve is placed on the inner side of the arm and supplies the forearm and hand. The musculo-cutaneous supplies the skin and muscles of the forearm and wrist.

Spinal Nerves.—The twelve dorsal spinal nerves send branches along the ribs and supply the muscles of the back.

Lumbar Nerves.—The five lumbar nerves send posterior branches to the muscles of the back; the anterior branches unite to form a plexus which sends branches to the muscles of the belly and the genital organs; the largest branch, the crural nerve, is distributed to the front of the thigh.

Sacral Nerves.—The fifth lumbar joins the sacral nerves to form the

sacral plexus; its largest branch is the great sciatic which passes down the back of the thigh, dividing at the knee into the external and internal

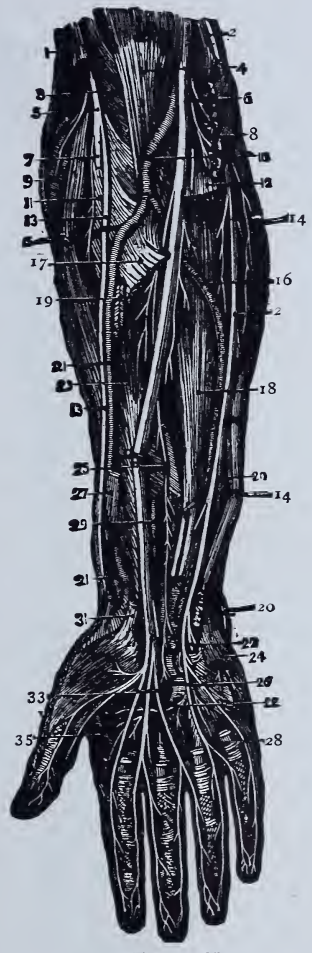

Figure 65.

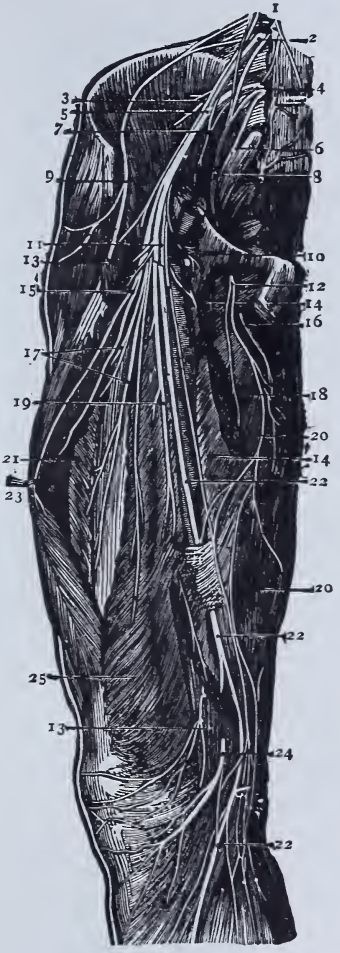

Figure 66.

Figure 65.—DEEP DISSECTION OF FRONT OF FOREARM. 1, supinator longus; 2, ulnar nerve; 3, brachialis anticus; 4, biceps; 5, musculo spiral; 6, median; 7, posterior interosseous; 8, pronator teres; 9, extensor carpi radialis longior; 10, brachial artery; 11, supinator brevis; 12, flexor sublimus digitorum; 13, radial nerve; 14, flexor carpi ulnaris; 15, extensor carpi radialis brevior; 16, ulnar artery; 17, origin flexor sublimus digitorum; 18, flexor profundus digitorum; 19, tendon pronator teres; 20, dorsal branch of ulnar nerve; 21, radial artery; 22, deep branch of ulnar nerve; 23, flexor longus pollicis; 24, adductor minimi digiti; 25, anterior interosseous nerve; 26, digital branches of ulnar nerve; 27, tendon of supinator longus; 28, one of the lumbricales muscles; 29, pronator quadratus; 31, tendon flexor carp iradialis; 33, digital branches median nerve; 35, abductor pollicis.

Figure 66.—NERVES OF THIGH. 1, sympathetic gangila; 2, third lumbar; 3, branches to iliacus; 4, fourth lumbar; 5, anterior crural; 6, lumbo-sacral; 7, branch of the psoas; 8, obturator; 9, external cutaneous; 10, nerve to pectineus; 11, branch anterior crural; 12, superficial division of obturator; 13, sartorius muscle; 14, adductor longus; 15, branch to rectus; 16, deep division of obturator; 17, branches to vastus externus and crureus; 18, adductor brevis; 19, branch to vastus internus; 20, adductor magnus; 21, vastus externus; 22, internal saphena; 23, rectus femoris; 24, patellar branch of saphena; 25, vastus internus; 26, gracilis.

popliteal nerves; these are continued down the leg as the anterior and posterior tibial nerves supplying the leg and foot.

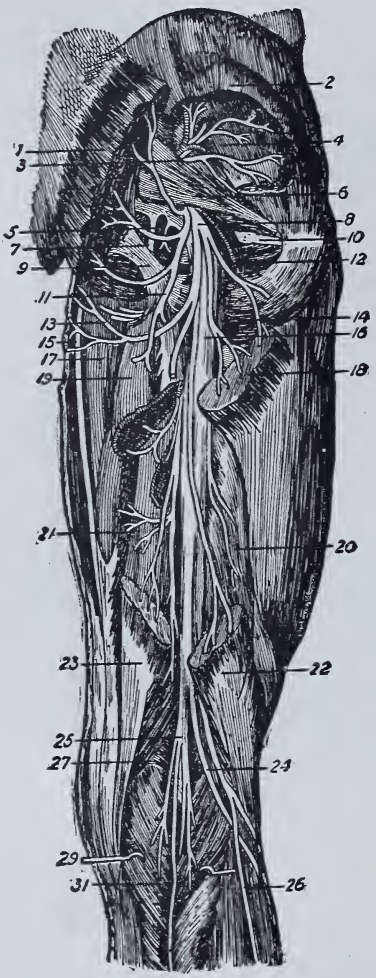

Figure 67.

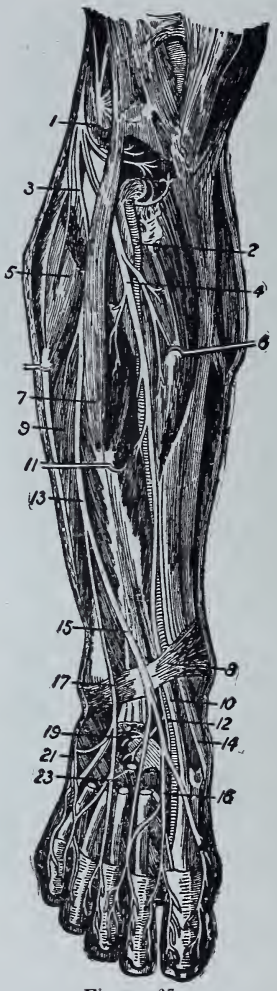

Figure 67a.

Figure 67.—BUTTOCK AND BACK OF THIGH. 1, gluteus maximus; 2, gluteus medius; 3, glutial artery; 4, gluteus minimus; 5, nerve of obturator internus; 6, pyriformis; 7, pudic nerve; 8, small sciatic nerve; 9, great sacro-sciatic ligament; 10, obturator internus; 11, inferior gluteal nerve; 12, tendon obturator internus; 13, inferior pudendal nerve; 14, quadratus femoris; 15, gracilis; 16, great sciatic nerve; 17, adductor magnus; 18, insertion gluteus maximus; 19, origin of semitendinosus and semimembranosus; 20, short head of biceps; 21, semimembranosus; 22, tendon of biceps; 23, tendon of semitendinosus; 24, external popliteal nerve; 25, internal popliteal nerve; 26, communicans fibrelaris; 27, popliteal artery; 29, gastrocnemius; 31, external saphenous nerve.

Figure 67a.—FRONT OF LEG. 1, external popliteal nerve; 2, anterior tibial artery; 3, musculo-cutaneous nerve; 4, anterior tibial nerve; 5, peroneus longus; 6, tibialus anticus; 7, extensor longus digitorum; 8, anterior annular ligament; 9, peroneus brevis; 10, tendon of extensor proprius pollicis; 11, extensor proprius pollicis; 12, dorsal artery of foot; 13, musculo-cutaneous nerve; 14, tendon of tibialus anticus; 15, internal branch of musculo-cutaneous nerve; 16, cutaneous branch of anterior tibial nerve; 17, external branch of musculo-cutaneous nerve; 19, deep branch of anterior tibial nerve; 21, external saphenous nerve; 23, extensor brevis digitorum.

INDEX TO PART I OF BOOK III

Preventive Medicine

The Prevention of Disease by Elimination of Disease Carriers

Part I of Book III tells of how disease is carried by insects and other seemingly harmless means.

Consult the Part, Index and the Reference Index, also General Index.

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Book III.

PREVENTIVE MEDICINE.

PART I.

THE PREVENTION OF DISEASE BY ELIMINATION OF DISEASE CARRIERS.

When speaking of preventive medicine, we include the methods used by physicians, State and Federal Government Boards of Health, etc., to prevent the spread of disease, but most important is the work done by past and present men of science and their willing patients who have given their time, labor, and in many cases, their lives to discover the underlying causes of disease, for the latter, like everything else in this world, has its reasons for existence. Thus it can readily be understood that disease cannot be properly prevented when the underlying cause is unkown.

Before dissection of the human body and experiments on animals were permitted, man's knowledge of his own body and disease, its causes and symptoms and treatment was mere guesswork. Thus in past centuries the arteries were thought to contain air instead of blood; disease was believed to be a curse from heaven or the king and everything lay in the hands of the Gods as to whether a person recovered or not.

In the last century, man began to awaken from his sleep and by means of the discovery of the microscope and the permission to experiment upon living animals more and more the cause of disease, its transference from one animal to another and then from animal to man and man to man was tried, and always the same symptoms occurred in the animal or man into which the blood of the animal suffering from the original disease had been placed by injection into their blood, etc. By these methods gradually the cause of disease was found to be due to the presence of minute living bodies called bacilli or germs, etc., which were only visible when the blood, spit, urine, etc., of the sufferer was examined

under the microscope and from this beginning are due the marvelous results of the present day in the prevention, treatment and cure of disease.

Health.—Disease can be prevented by the individual doing everything in his power to keep in the best physical condition. Disease is a common enemy of all of us, waiting to destroy, but Nature is in league with us if we obey her laws. With a normal body and pure blood should the invader arrive, the fight is on our side. But once the body is weakened by heredity as a result of our parent's or forefather's neglect of the body, through the abuse of alcohol, tobacco or immoral living, lack of exercise, overeating and loss of sleep, overwork or lack of work or improper food, then will the soil be fertile for the planting of the germs of disease. When exposed and once planted the fight will be in their favor, as the rundown body will not have sufficient vitality to overcome the invader and sickness and death result.

How Can We Keep Healthy?—The best answer to that question is, to be the child of healthy parents and come from a sturdy stock. To be nursed at the mother's breast and raised out of doors in the sunshine and fresh air, to sleep with plenty of air in the room at night. To have a natural movement of the bowels once a day. And through childhood to receive three meals a day consisting of pure wholesome food, plenty of milk, free from germs, pure water and sleep from ten to twelve hours a night throughout childhood, depending on the age. To play and do work which will be in the air and develop the muscles gradually. Every child should be vaccinated any time after the sixth month and repeat at the seventh year, to be done at once, in addition during an epidemic of small pox. It is not necessary or right for a child to have scarlet fever, measles, diphtheria, etc., as so many people think. They are often followed by deafness, heart disease, nervous diseases and paralysis which Nature never meant to inflict a child with to go through life.

Children's teeth, eyes and throat should be examined at intervals and many defects corrected. The tonsils and adenoids (growths which stop up the nose and prevent air being breathed properly) should be removed. Enlarged tonsils often cause deafness by preventing air from the throat reaching the ear cavity due to stopping the opening of the Eustachian tube which leads from the throat to the ear.

Children should not be taught too many branches at school. Every school should be well lighted with plenty of fresh air. Many of the smaller schools are now being built on open roofs of buildings in large cities or on platforms placed out of doors with just a roof overhead to

protect the children. All schools should be held in the open where possible. There is absolutely no chance of cold if the children are warmly dressed and experiments have proven that the children are healthier, more attentive and mentally efficient where they have been in school in the open air.

How May Adults Remain Healthy?—In this day and generation the struggle for existence is becoming more and more complex, the occupations are more enacting and confining, exposure to accidents more frequent, due to modern machinery and its difficult handling. Competition in all lines is great and therefore more strain is put upon the brain and nerves of man in all walks of life. This leads in time to state of "Overwork," nervous prostration or worry, if the individual has not the physical strength to stand the battle or fails to keep himself in a normal state of body and mind by careful living.

When in the latter condition, man is a suitable soil for development of disease which makes short work of the rundown system, and such a person when exposed to disease or accident is very apt to succumb unless some reserve vitality comes to the aid of him or her and the physician or surgeon in attendance in the uneven battle for life.

Man can keep his health and thus prevent disease by insisting on getting the best and purest of foods, working in factories or shops, dairies, barns, etc., which are well lighted and ventilated, free from dust, smoke, irritating vapors from paints, gases, acids, etc. By insisting upon regular working hours, eight hours sleep, dry and warm clothing if exposed during outdoor work, but not too warmly dressed for indoor work. Tea or coffee in moderation is not harmful. Light beers, Porter, Stout, Ale; wines, as Sherry, Port, Claret, without strong preservatives or alcohol, except in small proportions, are not harmful and refresh and cheer the tired nerves. Whiskey, brandy, cognac, gin, except as medicine, are absolutely harmful and the whiskey which the Government allows to be sold in this country is a disgrace and a poison. More and more corporations and business men are insisting on their employees abstaning from its use. It causes a sense of stimulation or well being, which is temporary and is soon followed by a sense of depression which can only be relieved by a renewal of the dose and thus stupid man continues to be temporarily stimulated, while the total effect of his imbibing is to lower his vitality, destroy his mind, cloud his judgment and render him vicious; ruin his appetite by its action upon his stomach, harden his liver and destroy his kidneys.

COMMON CARRIERS OF DISEASE.

Why is it that Disease Spreads?—It has been found by scientists that certain definite living bodies (germs) are the cause of certain diseases, as tuberculosis, smallpox, typhoid fever, diphtheria, etc.; and other diseases must be caused by other undiscovered bodies, which will some day be known. These minute living bodies are active and give off poisonous material which destroys the tissues, organs, etc., of the body. When a person is ill, these germs are being continually thrown off in the waste materials of the body, in the spittle, bowel movements, sweat, saliva, urine, etc. If these products of disease are allowed to remain in a vessel, the carpets, floor, soil, etc., they dry and in the form of dust are blown about in the air of the house, street or country road. If they come in contact with clothing or household furniture, they can be carried. Should a nurse or attendant upon a case be careless about disinfecting the hands or clothing during or after the management of a contagious disease, he or she can become a common carrier by touching food, dishes, clothing, etc., used by other members of the family.

Water is a common carrier of disease, particularly typhoid fever, cholera, etc. Therefore, to prevent the spread of disease, every farmer, dairyman, occupant of a dwelling, factory, citizens of villages, cities and States, should see that they have a clean water supply free from germs and not contaminated by dirty water or refuse from a toilet, pig pen, stable, etc., which might contain germs carried from a patient or animal suffering from any one of the contagious diseases. One case of typhoid fever along the edge of a mountain stream, carelessly managed, thus permitting bowel movements to be thrown into or washed into the stream by rain, melting snow, etc., could cause an epidemic in every village which received its water supply from that stream or the river into which it emptied.

Milk can be a common carrier of disease, such as tuberculosis, typhoid fever, scarlet fever, measles, diphtheria, etc. Most States, however, have protected the supply of milk by the enactment of laws covering the inspection of cattle, the erection of well lighted, clean and ventilated dairies, boiling and sterilization of all utensils used in its handling, even the wearing of sterile gowns by the milkers and attendants, cleansing of the cows' udders before and after milking and currying and brushing the cattle and covering them with light blankets. Milk should be kept at even temperature after being placed in sterile cans to prevent the forma-

tion of germs which will develop even in transit to the consumer in the country or by train or in the milk bottles prior to city delivery. Railroads are compelled in some States, and should be in all States, to furnish refrigerator cans with ice and the dealers in the city should particularly during the warm weather, have a refrigerator or ice in the delivery wagons to maintain an even temperature for all milk delivered.

How Can the Housewife Protect Her Children from Drinking Germ-Laden Milk?—First make sure that the dairy from which the milk is supplied is clean and up-to-date and the city dealer delivers the milk at her doorstep in clean bottles. Do not allow it to sit in the sun in the early morning in warm weather, or about the kitchen at any time of the year, but place it immediately on ice in a clean refrigerator until ready to use. When taking a certain quantity of milk out of the bottle, if for the baby use a Chapin dipper, and do not allow it to stand uncovered for flies to contaminate. Milk may also be contaminated by water from any source of pollution if dairy utensils are carelessly washed with a supply of water from an infected water supply as any dirty well or one contaminated by cess pool, out-house, manure pit which is infecting water through the soil or from drainage.

It is absolutely vital to a country to protect its milk supply as two thirds of the deaths under two years of age are traceable to either germ-laden milk from dairies or not properly handled by dealers, nurses, mothers, etc., who are careless or too ignorant to appreciate the danger of allowing baby's milk bottle nipple being dirty, contaminated by flies or who allow a milk bottle to sit in the hot morning sun,—result a sick baby, followed by death.

Insects as Common Carriers.—Great strides have been made in recent years by scientists in regard to the further prevention of disease by studying the life habits of insects. It has been clearly proven that the poison or germ of certain diseases are carried by them, such as tuberculosis, typhoid fever, bowel complaints of children, by the common house fly; malaria and yellow fever by the mosquito; the bubonic plague by the rat flea, of which there are several varieties, and the squirrel flea, of which there are also several.

It is easily understood that to prevent the spread of a contagious disease from one individual to another, the precautions are not complete unless he or she be protected against either the bite of a mosquito or flea which has received into its own blood the poison or the germ causing the disease, which it conveys by biting another person. Flies should be kept

out as, by coming in contact with the spittle or discharges from a patient, they carry the germ or poison upon their feet, etc., to the food, milk, water and by direct contact to another person.

Thus to aid in the prevention of disease, the numerous Boards of Health of City and State have issued regulations and instructions whereby these insects can be destroyed and then every person, sick or well, can be protected. If well, the fly is a danger by bringing disease into our home, if ill, it can convey our disease to another screenless home and start an epidemic.

The Common Fly (Musca Domestica).—The only way to prevent the fly carrying disease is to destroy his breeding place, keep him out of the home, etc., when developed, by screens and swat or catch by fly paper, etc., every one seen in a room.

House flies are a danger to human life. They are born in filth, feed upon garbage, sewage and waste matter of all kinds. They carry germs on the proboscis of their bodies, and a single fly is known to have carried as many as 350,000 germs and given them off into the liquid food in which it was floating. They also carry numerous germs inside their bodies which they convey to food, etc., in their vomit and bowel matter.

Flies can carry disease germs of typhoid fever, consumption, diarrhœa, dysentery and other diseases from a sufferer to you. They come in contact with your food, milk, water, etc., your sleeping child, or alight on an open wound, direct from the garbage can, the cuspidor, the spit in the street, etc., from decaying animal and vegetable matter and from the sick room. Thus every individual should do everything possible to aid the physician, city and state in destroying these known carriers of filth and disease and thereby prevent sickness, due to carelessness and indifference by permitting flies to breed and live.

How to Eliminate the Breeding Places of Flies.—Flies breed by laying larvæ or eggs which can be seen as Maggots in all undisturbed filth. It requires eight days for the millions of eggs to grow. Keep garbage can tightly covered, protect by screens so that flies cannot reach the garbage. See that garbage is collected promptly and cleanly. If you live in the country, burn or bury it. Allow no filth or decaying matter of any kind to accumulate in or near your premises. Keep stable clean, place manure, old straw, etc., in screened pits, vault, or in boxes or barrels, which should be well covered. Screen all privies, vaults and openings to cesspools or drainage structures. See that they do not overflow

and use chloride of lime freely. Pour kerosene into drains, keep drainage systems in good order and repair all leaks at once. Destroy sawdust cuspidors, they are unsanitary. Clean cuspidors daily and keep a five per cent. carbolic acid solution in them all the time. Permit no dirt to accumulate in corners, behind doors, back of radiators, under stoves, etc. If there is a nuisance in the neighborhood, notify the nearest health authority.

What to Do to Get Rid of Flies.—Screen your windows and doors. Do it early in the Spring before fly time and keep it up until cold weather comes. Screen all food, especially milk. Do not eat food that has been in contact with flies. Screen the baby's bed and keep flies away from the baby's bottle, nipple and food, rattle, toys, etc. Keep flies away from the sick, especially those ill with typhoid fever, scarlet fever, diphtheria and tuberculosis, etc. Screen the patient's bed. Kill every fly seen to enter the sick-room. Disinfect all discharges, dressings, bandages, etc., from the patient and burn where possible. Catch all flies by use of sticky fly papers, traps and liquid poisons. A good poison to destroy flies is two teaspoonfuls formaldehyde in a pint of water sweetened with sugar and placed in saucers throughout the house. Be sure and have poisons out of reach of children and family pets. To rid an infected house of flies, burn in each room pyrethrum powder. Darken the room allowing only ray of light to enter at edge of window shades. Sprinkle pyrethrum powder over hot coals and carry about room. The flies will be stunned by the fumes and can be readily swept up. This is done because the flies will seek the light to escape the fumes and fall near the windows. Swat the fly whenever seen. A paddle can easily be made to kill the flies with by taking an oblong sheet of wire gauze and nailing it to a stick of suitable length for a handle.

The Mosquito.—The mosquito is a common carrier of Yellow Fever and Malaria or "Chills and Fever" as it is sometimes spoken of by the public. Malaria is caused by a tiny parasite which can only be seen by the microscope in the blood of man and the mosquito. It lives and multiplies in the blood of an individual suffering from the disease.

How is Malaria Carried by the Mosquito?—Let us imagine that a man has returned from some malarial country and takes up his abode in a healthy, yet mosquito infested village. This man may be fairly over his attack yet he still suffers from an occasional chill with fever. He has no screens in his house, nor have his neighbors, unless previously told to follow such precautions. A female mosquito or several attack him

and suck his blood which contains these tiny parasites. The mosquito takes millions of these little parasites which then undergo a development in the body of the insect and can be seen microscopically in the stomach, intestine, and the small glands in its mouth, which secrete the saliva. Now let us follow this mosquito and see what harm it can cause in a community. It flies through a screenless door or window and lights on the arm, etc., of an unsuspecting neighbor. In biting a person the mosquito ejects or gives off its saliva into the wound to aid in diluting the blood of the person which it has bitten, as the blood is too thick to be sucked up through the tiny tube in the bill (proboscis) of the mosquito. In this way the bite of the female mosquito whose body contains the small animal parasites which cause Malaria, pass by means of the saliva into the blood of the person during the act of sucking up the blood. Thus the mosquito sucks up the blood of the individual and in exchange injects into his blood the saliva containing the parasites. These parasites multiply in the blood of the person bitten and produce poisons which give rise to the chills, fever, aching limbs, etc., known as Malaria, Malaria Fever or "Ague," (chills and fever). It can readily be seen how malaria will spread when individuals in a community have millions of parasites in their blood, and at the same time mosquitoes are carrying around in their bodies, millions of the same living germs which they suck from the blood of the infected person, develop and inject them into the blood of every person they bite.

How Mosquitoes Develop.—A female mosquito lays from 200 to 300 eggs at a time and always in standing water, as the eggs must have still water and no matter how filthy the water, it will not destroy the eggs or prevent their development.

How to Destroy the Breeding Places of Mosquitoes.—No breeding places, no eggs and consequently no mosquitoes. When we consider that one female mosquito can lay 200 to 300 eggs at a time and then figure the number of living pests we have seen in one evening, it can readily be seen how rapidly they can develop and in what numbers increase if their breeding places are allowed to remain about any premises. Mosquitoes lay their eggs in standing water, such as is found in cesspools, drains, open sewers, catch basins, foul street gutters, stable yard pools, tin cans, rain barrels or any object which holds water. In from a few hours to a day, depending upon the temperature and surrounding conditions, the eggs open and what we know and have seen as "wrigglers" come out and can be seen in the water in which the eggs have developed, as tiny slender

living bodies 1/8-inch in length. In five to seven more days, the "wrigglers" become "tumblers." In another five to seven days the covering of the head of the "tumblers" cracks and the fully developed adult winged mosquito comes out and, in the case of the female of the species, flies off ready to annoy and bite.

Every individual should do everything possible to get rid of all breeding places. Examine your premises and be sure that they are free from any vessels, etc., which will receive and contain still water for one week or longer, that will afford a breeding place for mosquitoes. A loose brick causing a depression in the pavement, defective plumbing, cups, buckets, barrels, water pans in chicken yards, etc., a horse trough, a gutter on the eaves or roof of a house, bottles, barrels, tin cans, water spouts out of repair or clogged up and so do not drain properly. These collectors of water should be removed and all plumbing, drains, roofs, etc., repaired.

Mosquitoes will breed indoors as well as outside. Any water left in clogged sinks, toilet fixtures, water pitchers in bed rooms, slop jars buckets, tubs, spittoons, aquariums without fish, or in fact any vessel which is capable of holding a few teaspoonfuls of still water, will afford a breeding place for the mosquito. Neglect to remove or repair the above structures is only allowing a large crop of mosquitoes to develop and annoy you and your neighbors by bites, disturbing your comfort, preventing rest and sleep and subjecting you to the malaria and yellow fever if you are in a district where these diseases are known to exist.

Every citizen should use his influence to have every village, city and State corporation appropriate money to eliminate all marshes by filling with soil, drain all stagnant streams and have kerosene oil spread on the surface of lakes, ponds or any other body of standing water, no matter how small. The object of using oil is to prevent the "wrigglers" and "tumblers" from getting air, for after leaving the eggs, they require air to develop. A film of oil prevents the "wrigglers" from getting the needed air and they are destroyed by choking. One ounce of oil is sufficient to cover 15 square feet of water. Oil should be applied and removed once a week during the breeding season. When standing water must be kept, screen the containers or keep tightly covered, so the females cannot deposit their eggs. Screen all doors and windows. Put screens up early in the spring.

How to Destroy Existing Mosquitoes.—Kill every mosquito seen about the house. Every mosquito killed in the winter or spring will lessen the

number of mosquitoes in the summer by thousands. Use a paddle, made of an oblong sheet of wire gauze tacked on to a strip of wood, to serve as a handle, to kill both the fly and mosquito whenever seen. One of the best means of killing female mosquitoes (as they survive from one season to another) is to begin in the winter or early spring to fumigate the air with the following mixture:—Equal parts (by weight) of carbolic acid crystals and gum camphor. Liquify the carbolic acid crystals by gentle heat, break up gum camphor into small pieces and then pour the liquid acid slowly over the camphor. The acid will dissolve the camphor completely and the solution formed is permanent and will evaporate slightly at ordinary temperatures. To fumigate a tightly sealed room, three ounces of this liquid will suffice for 1000 cubic feet of air space. Place it in a tin over an alcohol or other lamp and in addition place the lamp on a tin waiter or old pie plate, heat and it will require about one half hour to evaporate these three ounces of liquid. This solution is death to the mosquitoes and flies. It is not poisonous to man and is not destructive to fabrics and materials, furniture, etc. It is not explosive, but is inflammable and precaution should be taken to prevent fire. Mosquitoes found upon the ceilings of bedrooms in the evening may be quickly killed by taking a shallow tin cup or lip of a tin can, tacking it to a stick and then fill it with kerosene. Place quietly under the resting mosquito which either falls into or flies against the oil and is killed. Burn Chinese punk and mosquitoes will be driven away temporarily. Equal parts of olive oil and oil of citronella applied every half hour or so to the skin of the face, neck, hands and ankles will keep away mosquitoes. This method is useful to farmers, hunters, lumbermen or laborers about woods, swamps, etc., where mosquitoes are an annoying and disease carrying pest.

Fleas.—There are one hundred varieties of this pest which live on dogs, cats, birds, squirrels, rats, mice, etc. It has been proven that fleas carry the germs of Bubonic Plague, which has caused as high as 113 deaths in 119 cases during an epidemic. The disease was found to be spread by means of rats, mice and squirrels of all species and the flea (*pulen fasciatus*) in the fur of the animals was the medium by which the disease was conveyed to human beings by biting them and injecting the germs of Plague into their blood.

The forms which pester the American homes are the House Flea (*Pulen Irritans*), the Cat Flea (*Pulen Felinius*), and the Dog Flea (*Pulen Canis*). Each female flea deposits from eight to twelve whitish

ovoid eggs in dust or lint, under carpets and the larger crevices of woodwork. In the summer they develop in about four weeks from the egg to the adult flea, in winter they develop in about six weeks. Four to six broods, as a rule are hatched out during each summer.

The House Flea occurs in dwellings, breeding in bedding, clothing, carpets, window curtains, etc. They attack their victims at night. The Cat and Dog Flea, though they annoy only their respective victims, are as troublesome to human beings as the human flea.

To Get Rid of Fleas.—Remove and clean rugs, etc. Dust Pyrethrum powder into all cracks and crevices where dust or dirt may be lodged to destroy the larvæ. Scrub the floor and *footboards* with hot soap and water to kill the adult fleas. To eliminate fleas on cats or dogs, dust Pyrethrum powder into the hair. The fleas will fall off while stupefied and should be immediately swept up and burned. Sleeping places of dogs and cats should be cleaned and covered with a carpet or matting that can be shaken into an open fire and the eggs, larvæ and fleas with which it is generally covered, destroyed. During an epidemic of Bubonic Plague destroy all rats, mice, stray dogs and cats, etc., and protect your house by killing all fleas whether in the furnishings or on your family pets. Flea bites are painful and if scratched may cause an abscess, followed by blood poisoning. The pain and itching of a flea bite can be counter-acted by touching the wound with ammonia water. To prevent infection, bathe the wound with a 5 per cent. solution of carbolic acid in water and bandage until healed.

Cockroaches.—Cockroaches are brownish or black in color, broad and flattened in shape and smooth and hard to the touch. All cockroaches should be destroyed. They not only annoy, but, even though it has not been proven, they, no doubt, carry disease germs by coming in contact with discharges, etc., from ill persons and convey filth and germs to food, etc. They are very numerous in pantries, kitchens and in the walls near a stove and fire places. They are apt to be abundant in oven rooms or bakeries and wherever the temperature is kept above normal. They usually appear at night or wherever light is absent and thus are protected from their common enemies. Owing to their shape they can squeeze into tiny cracks. They scurry away when surprised and generally escape capture or destruction, due to their speedy gait. They feed on animal matter, cereals and any food material; also eat woolens, leather cloth and leather bindings of books (due to the presence of paste). They give off a fetid, nauseous odor, which persists even after thorough cleaning. They

taint food supplies, stain shelves and dishes and when present in large numbers, render the air of a room unbearable. This is due not only to their excretion, but mostly to an oily liquid secreted in the scent gland and a dark colored fluid in the mouth. They will destroy bedbugs. No contagious disease can be said to be properly treated or isolated, if cockroaches are scurrying about the walls, carpets, food, etc., of a sickroom and allowed to persist and possibly convey the germs of the disease to others in the house or to neighbors.

How to Destroy Cockroaches.—Take a quarter of a teaspoonful of phosporous, two level tablespoonfuls of flour, mix and make into paste with well sweetened water. Phosporous is very inflammable and should not be allowed near fire and being poisonous must not be placed where children and family pets can touch or eat it. Place the paste where the roaches can reach it.

Bed Bugs.—The bedbug is a small but plainly visible ovoid-shaped bug, giving off a peculiar nauseous odor. It is of a reddish brown or rusty color with some discoloration on the abdomen and is furnished with a puncturing or sucking apparatus. The eggs are tiny white oval bodies. As many as 6 to 50 batches are laid in cracks of beds, furniture, picture frames, wall paper, crevices of woodwork, floors, etc. Each batch of eggs develops in from 6 to 11 weeks, and several batches may be hatched in a season. One generation succeeds another as long as the temperature remains sufficiently elevated. They hibernate during cold weather, during which season the insect is merely stupefied and renews its activities upon the return of warm surroundings. It is found in the dwellings of man, but other species of the same family have been found upon birds, as the common chimney swallow, pigeons and bats.

The bedbug comes out at night and begins to bite and annoy. It conceals itself very cleverly and quickly in the day time or when surprised by a sudden light at night. It lives on the blood of man particularly, but can exist on food of other insects. It thrives best on filth and in old houses can keep alive without food for a year.

Bedbugs are said to transmit smallpox. There is a possibility of their carrying the germs of typhoid fever and leprosy, but this fact has not been proven as yet. The bite is poisonous to some individuals, resulting in inflammation at the seat of the bite. This is supposed to be due to the same secretion which gives the characteristic nauseous odor.

How to Destroy Bed Bugs.—Spray with pure spirits or crude turpentine or benzine by using an ordinary nose and throat atomizer which

can be bought in a drug store, all brass or wooden beds after scalding where possible with hot water, spray the crevices of floor, back of picture frames and where a house is "alive" with the pests repaper and paint rooms. Spirits of turpentine will kill where carbolic acid has failed. After each spraying, watch for the bedbugs as those which are not destroyed will hasten to escape and can be killed. Remember benzine and turpentine are inflammable and poisonous. No lights should be permitted in the rooms during or immediately following the use of these drugs. When articles cannot be sprayed, as books, etc., seal up the room and burn a sulphur candle. Place sulphur candle in a tin cup and place cup in a tin or metal pie plate containing water.

Lice.—The body louse has been found to be a carrier of typhus fever. It carries the germ in its body after biting a sufferer from the disease and by biting a person can inject the germ into his blood. Lice belong to the insect family. The species which infest human beings are about 1-10 of an inch in length and are found on the covered regions of the body and clothing. Lice always grow from the eggs laid by an adult louse and never originate from filth or other matter. They hatch out within a week and the young are capable of reproduction in less than two weeks. A single adult female will produce 5,000 lice within eight weeks.

The annoyance of these pests biting a human being will cause, if sufficiently prolonged, a nervous irritation, and a condition of ill health follows. There are three types of lice which infest man. The Head Lice (*Pediculus Capitis*), the Body Lice (*Pediculus Vestimentorum*) and Crab Lice (*Pediculus Inguinalis*).

The Head Lice.—They are grayish in color with blackish margins and show a reddish tinge due to the blood they have sucked from their victim. The eggs or nits are seen attached to the hair shafts on the scalp at some distance from the end of the hair and are tiny white or grayish pear-shaped bodies seen upon close examination.

Treatment.—It is necessary to remove eggs and adults at the same time, so wet the hair thoroughly with crude petroleum (from any drug store) keep hair wet for three hours, then wash whole head with warm water and soap. Repeat this wash once a day for three successive days. The eggs can then be removed by combing the hair with a fine tooth comb wet with vinegar. Where possible the treatment can be made more thorough and permanent if the hair is cut short.

Body Lice.—The Body Lice are larger than the head lice and are commonly found upon the body. This type has bands across the back.

Crab Lice.—They usually develop in the seams of clothing, however the eggs have been found upon the hairs on the body's surface. They live in concealed portions of the clothing where the skin is most conveniently reached, where the various bites are to be found most often, as around the neck, across the shoulders, the upper part of the back, around the waist and outer side of the thighs.

Treatment.—All clothing worn should be boiled and gone over with a hot iron to destroy them. A hot bath should be taken by the person annoyed by the parasites. Bathing suits should be carefully boiled as they often become infested with the eggs and body lice from a person who may have worn the suit and had them upon his or her clothing or person.

The Crab Lice.—These are a smaller type of the former species, as head or body lice. They are nearly as wide as long. They have strong legs spread out on the sides of the body, which makes them appear like crabs. They are of whitish color, slightly shaded on the shoulders and legs with a red tinge. Crab lice are found upon the hairy regions of the body other than the scalp. The spread of these pests can be checked by washing all toilet seats with scalding water, and boiling towels and linen from suspected persons. Laundries should be especially careful as to the thorough boiling and disinfection of all clothing, as the eggs of these parasites can be conveyed in bed-clothing, towels, etc.

Treatment.—Shave the hair in the region of the itching and wash twice a day with a lotion made of

Tincture of Larkspur.....½ ounce
Commercial Ether .....8 ounces

The Itch Mite.—This parasite which afflicts man causes the condition spoken of as "Itch," "Seven Years Itch," "Army Itch," "Jackson Itch," etc. It has an oval body with spine-like projections. The female is larger than the male and measures 1-70 of an inch in length by 1-50 of an inch in width. The female causes the development and pain of the afflicted person. She burrows into the superficial skin, forming a tortuous or a straight dotted line, slightly elevated which varies from 1/8 to 1/2 inch in length. This line if observed closely appears dark gray or blackish in color and is slightly more elevated at one end. The eggs are laid in this furrow and at the elevated end is usually found the female, which has perished, as a rule. It takes almost 13 to 20 days for the eggs to develop into adult mites. The young mites feed upon the tissues of the

body and move about causing discomfort until they reach the surface of the skin where they mate and females start a fresh burrow and deposit more eggs.

The Itch Mite is commonly found in the skin between the fingers, hands, folds of the wrist, arm pits, around the stomach and about the neck. It is not known as a carrier of disease, but can be dangerous to health by causing burrows in the skin and abrasions due to scratching which afford an opening for germs to enter the system of the bitten individual.

The Itch Mite can be conveyed from one person to another by means of towels, clothing, bathing suits, etc., carelessly washed, handled, or worn by anyone afflicted with the pests.

Treatment.—To destroy them, have all bed linen and clothing used by the individual infested, thoroughly boiled or baked. Treat the region of the body by taking a bath, washing first with warm water and castile soap, using a brush to thoroughly open up the burrows and expose the eggs for destruction. After this, apply an ointment,

Sublimed sulphur.....	one drachm	(teaspoonful)
Balsam of Peru.....	one drachm	(teaspoonful)
Vaseline	one ounce	(2 teaspoonfuls)

Rub in morning and evening for from two to four days and repeat at end of a week if any itching continues.

THE PUBLIC DRINKING CUP.

The drinking cup is a common carrier of disease. It can and does spread consumption, syphilis and typhoid fever. Any child or adult suffering from tonsilitis, diphtheria, scarlet fever or other communicable diseases can infect another by using a public tumbler or cup, whether at a public railroad station, school house, ball park, pump, railroad train, ferry boat or steamship of any kind, etc.

The most of the State Boards of Health have had laws passed in recent years to abolish the public drinking cup and those states which have not done so are neglecting the public health by not enforcing this preventive measure, which would aid in checking the spread of disease.

The drinking cup should be replaced by a sterile paper cup which can be purchased in sealed packages or containers and are given away free of charge in trains, etc., and can be purchased for one penny from the slot machines in stations. They are destroyed after use and a more

refreshing and sanitary drink is obtained and the danger of contracting disease eliminated. The Public Drinking Cup Must Go.

THE PUBLIC TOWEL.

The towels in toilets, bedrooms of hotels and boarding houses can spread disease unless they are thoroughly boiled and laundered after use, Most hotels, railroad stations, Pullman cars, etc., have done away with the public towels in toilets and use a heavy tissue paper, either as a single towel or in rolls and torn off as needed, which is not expensive and is thrown away after use.

In Pennsylvania the State Board of Health has urged saloonkeepers, etc., to do away with the forks and spoons which are placed in a tumbler of water and are used by all comers at the free lunch counter and then replaced in the tumbler of dirty water for the next victim to use.

Disease can be controlled better when our proprietors of saloons, restaurants, hotels, soda fountains, etc., employ only healthy employees, free from disease and take pains to boil or scald every public glass and chinaware used by not only dirty, but disease-spreading persons. The barroom towel which hangs in front of the bar in the cheaper saloons for customers to wipe their mouth and hands upon, must not be permitted.

VENEREAL DISEASES.

Syphilis, gonorrhœa and a host of diseases which follow in their train, come within the scope of Preventive Medicine. They are not spread by water, air, food, or insects as are so many diseases, but develop only from contact with a sufferer (usually by co-habitation, but possible by non-sexual contact), or by the germs from a sufferer being imparted to another by towels, clothing or other articles. They may be communicated to an innocent wife by a diseased husband and *vice versa,* and many serious diseases and infirmities depending on these diseases may be transmitted to the children of the diseased, as instance the disease of Opthalmia or Blindness in Children, which occurs at or shortly following birth, and which is usually attributable to one or both of the parents suffering from gonorrhœa, although it may arise from other causes (see Index for article on Opthalmia, its cause, treatment and prevention).

Syphilis and gonorrhœa are so largely dependent on immoral intercourse that their prevention is largely a matter of moral uplifting of the

people. But, pending this moral uplifting, much is possible by the State and municipal governments placing these diseases on the list of contagious diseases which must be reported to the authorities, as is now required in respect of small-pox, scarlet fever and other diseases which are neither so loathsome nor have such far-reaching results for ill to mankind.

All parents should carefully read the articles on Syphilis, Gonorrhœa and Opthalmia, to be found elsewhere in this work (see Index), and then they should carefully guard their children and at proper age thoroughly instruct them in the fearful ravages of venereal disease. There is too much false modesty in these matters on the part of parents. The general discussion of sexual matters in novels, in sensational books on eugenics and in ordinary conversation is to be condemned, but it is the duty of every mother to her daughter and of every father to his son, to not only keep constant guard over them in these matters, but, at the beginning of puberty, to instil into their minds the real truths that they may become imbued with the horrors of venereal disease, yet realize the nobility of true sexual life. Professors and teachers in resident schools and colleges where youth is congregated should also have regard to this vital subject and take means to properly impart useful knowledge, and not only adopt every possible precaution to prevent students from meeting lewd persons, but by periodical medical examination discover if any venereal disease is existent, and if found in any individual then suspend such student until the disease be eradicated beyond the possibility of contagion.

Syphilis is a more horrible disease than small-pox and may be easily communicated to the innocent by a common towel, by a brother kissing his sister or a son his mother, and in many other ways, and yet the syphilitically diseased may go where they please and little or no precautions are taken as to the spreading of the disease. It is estimated that in New York City alone 250,000 people are suffering from this loathsome disease, either inherited or acquired, and when it is borne in mind that large numbers of these have innocently acquired it and are now in turn transmitting it to others, the enormity of the evil and the imperative need of preventive measures, will be realized.

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Water In Its Hygenic Relations

Part II of Book III treats of pure and impure water and its various effects upon the human body, both as respects internal and external uses.

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PREVENTIVE MEDICINE.

PART II.

WATER IN ITS HYGIENIC RELATIONS.

THE USES OF WATER.

Adaptation of Water to Human Needs.—Few people who enjoy the benefits of water think what a wonderful and unanswerable argument is afforded by them in favor of the goodness of an all-wise Creator to his creature, man. Of all the fluids with which we are acquainted water is by far the best adapted to the almost infinite variety of human wants, and it is the one of all others most abundant in nature, constituting as it does about three-fifths of the surface of our globe, and nearly seven-tenths of the bodies of man and of most animals. If the common fluid upon which we had to depend were quicksilver, or oil, its boiling-point would be so high that articles of food which we attempted to cook in it would be seriously injured in the effort to prepare them by its aid; and, on the other hand, nearly all the advantages of ice would fail us, in consequence of the exceedingly low temperature at which these substances remain fluid.

Water in All Substances.—Water was considered by the ancient philosophers as one of the four elements out of which all visible objects were constructed; and, in reality, it enters to a greater or less extent into the composition of nearly all natural substances. Thus, for example, some vegetables, like cabbage or celery, contain as much as ninety-five per cent. of water; and, on the other hand, close-grained marble may contain as much as four per cent. of water, or almost a quart to the cubic yard. On account of its remarkable solvent powers, which enable it to take up a smaller or larger quantity of nearly every substance with which it comes in contact, water is never found pure in a natural state; and, indeed, absolutely pure water for chemical purposes can only be obtained by repeated careful distillations.

Air and Gases in Water.—A considerable amount of air generally exists in water, and is taken up by the gills of fishes, assisting them to accomplish the proper aeration, or rather oxygenation, of their blood. The air usually mingled with water may be expelled by boiling, but is absorbed again if the boiled water is agitated with access of the atmosphere.

Boiled Water.—The insipid taste of water which has been boiled is due to the absence of air. Many gases besides air may be artificially or naturally mingled with water, and some, like ammonia or nitric acid, are freely soluble in it. In sea-water, the presence of common salt, with small quantities of sulphate of soda or Glauber's salt, and, of the compound of magnesia and chlorine, called chloride of magnesium, render it entirely unfit for drinking, as many a hapless shipwrecked sailor has found to his cost.

Distilled Water.—At the present day, most sea-going vessels are provided with apparatus for distilling the water of the ocean, and so producing a pure and wholesome but insipid water, which can be rendered, however, more palatable by agitation with plenty of fresh air. Hence, the horrible agony of death by thirst among sailors is now much less frequent than formerly, although mariners in open boats, or cast upon small uninhabited islands, still sometimes scan with anxious eyes the briny waste around them, beholding—

"Water, water everywhere, but not a drop to drink."

Sea-Water.—Sea-water varies considerably in composition, being, of course, more concentrated, as a rule, in the tropical regions, where evaporation is most active, such, for example, as in the Mediterranean Sea and the Atlantic Ocean near the equator. According to analysis, the water in the English Channel contains in 1000 parts—

Chloride of Sodium	28.05
Chloride of Magnesium	3.66
Sulphate of Magnesia	2.29
Sulphate of Lime	1.40
Other Saline Materials	.76
Total Solid Matter	36.16

Besides these, and perhaps contributing largely to the healthful qualities of sea-water, there exist in the ocean small quantities of iodine

and bromide, and extremely minute amounts of some of the common metals. It has been found that, by dissolving a little common salt and carbonate of soda, lime and magnesia in distilled sea-water, its taste is rendered much more agreeable; and this plan, it is said, is adopted in the Russian navy.

Purity of Rain-Water.—The water, which rises in vapor into the atmosphere from all the oceans, seas, lakes and rivers of the globe is condensed after a longer or shorter time, and falls to the earth again as rain. Rain-water, being in reality a distilled fluid, is the nearest approach to a pure water which we find in nature, and when caught in clean vessels placed upon elevated objects is almost free from contamination.

Impurities in Rain-Water.—It contains, however, small quantities of organic matter, nitric acid and ammonia, all of which are washed out of the air through which it descends as rain. The source of the nitric acid is believed to be the nitrogen of the atmosphere, which combines with oxygen under the influence of the electric spark during thunder-storms. Nitric acid in rain-water exists in such insignificant amount as to be entirely unimportant in itself; but it adds very seriously to the danger of impregnation with lead from lead pipes, roofs and cisterns by rapidly dissolving that metal and forming the very soluble and highly poisonous salt, nitrate of lead.

SOURCES OF DRINKING WATER.

Evaporation.—Our supplies of drinking water are, of course, derived originally entirely from the rainfall. We need not consider now how the water found its way into the air. Without entering into the details of the process of evaporation, all that the present object requires is, that we clearly recognize the fact that spring, fountain, river and lake are all alike fed from the clouds which float over our heads and send their rain upon the just and upon the unjust. Hence, then, man is wholly dependent for his supply of this vital element upon the rain which comes down from heaven. He may dwell upon the most arid plains, but he drinks from the stream which flows beside or underneath his feet—which stream is itself fed by floods that fell perhaps a thousand miles away—and whatever mystery attaches to subterranean waters, we may be sure that, by a long enough circuit, we can trace every drop back to the clouds.

VARIETIES OF WATER.

Rain-Water.—In classifying waters, we have first to consider them as regards their sources. Rain-water, as already mentioned, is sweet and soft, and when filtered is perfectly adapted to all the purposes of life; the one difficulty about its use being the impossibility of collecting it pure and preserving it without contamination for the long periods of time and in the large quantities which would often be necessary.

Spring- and Well-Waters.—Spring- and well-waters are almost always more or less impregnated with the soluble ingredients of the earth and rocks through which they pass, and are therefore sometimes very unsuitable for the ordinary wants of life. As a general rule, they are colder than other waters, although hot springs are found in various parts of the world, some with a temperature as high as the boiling point.

Mineral Springs.—Mineral springs, notwithstanding they are much used for drinking, are properly medicinal agents. They comprise all those waters which contain sufficient quantities of dissolved matters, such, for example, as iron or sulphur, as to produce thereby a positive effect upon the systems of persons partaking of them. The mineral springs of this country are frequently valuable remedial agents in some chronic diseases.

River-Water.—River-water is, to a certain extent, similar to spring-water, but is much more apt to be contaminated with sand and clay, organic material from decomposing vegetable or animal remains, the refuse of manufactories, and especially with the sewage of cities and towns, to which it is probable immense amounts of sickness and death are annually due in all civilized countries. Unfortunately, river-water is that which is chiefly supplied to towns and cities, and therefore finds its way into the systems of vast numbers of our fellow-beings.

Stagnant Water.—Stagnant water is, from the large quantity of organic matter in a decomposing state which it holds in suspension or solution, exceedingly unfitted for drinking and culinary purposes, no matter how transparent it may appear; and it should, in consequence, be carefully avoided whenever running water can possibly be procured. Pond-water, canal-water, ditch-water and marsh-water all come under this category, and should be scrupulously shunned, under penalty of suffering from fever and ague, dysentery, typhoid fever, and many other dangerous maladies.

Quantity of Water Needed.—The quantity of water needed by man and animals must therefore be very carefully calculated. Repeated ex-

periments upon a very extended scale in England have shown that a healthy man requires daily as drink from two to four pints of water, this amount being in addition to that which is swallowed as moisture in food. The amount required for cooking is estimated at from half a gallon to a gallon or more. To this quantity, Dr. Parkes considers should be added for daily ablution, including a sponge bath, five gallons; daily share of kitchen and other utensils, and house washing, three gallons; and share of clothes washing, another three gallons; making up a total of a little over twelve gallons for each individual daily. In the poorer districts of the city of London, the amount used is stated to be only about five gallons daily. A shower-bath will require about four gallons extra, and a plunge-bath from forty to sixty gallons. Where water-closets are used an additional quantity of from four to six gallons daily for each person must be provided.

DISEASES FROM MINERAL IMPURITIES IN WATER.

Purifying Ingredients.—Since all rivers, spring- and well-waters contain a certain amount of dissolved matters, taken up from the soil through and over which they pass, it becomes a very important consideration to determine what these ingredients are in any particular sample of water, and also the kind and degree of such impurity which will not prove injurious to health. Dr. Letheby, from investigations made in sixty-five English and Scotch towns, arrived at the conclusion that from five to twenty grains to the gallon of the compounds of lime and magnesia are necessary to render drinking water in the highest degree wholesome.

Saline Impurity.—But any quantity of saline impurity exceeding thirty-five grains to the gallon renders a water unfitted for the freest domestic use. Such water would be popularly designated as a very "hard" water, but a good deal of indifference is caused by the nature of the hardness, that due to sulphate of lime, and called the permanent hardness because it is not removable by boiling, being decidedly most prejudicial to health.

Diseases Caused by Alkaline Waters.—The symptoms referable to an excess of alkalinity, arising from the presence of these earthy salts in a drinking water, are mainly those of a dyspeptic nature. At first the employment of hard water by persons who are unaccustomed to it produces diarrhœa, which is occasionally serious or even dangerous in its

character. But the long-continued use of such a drinking fluid is thought to cause habitual constipation, with the heavy train of evils, including piles and liver complaint, which depend upon it. Calculus, or stone in the kidney or in the bladder, which gives rise sometimes to the most horrible agony human beings are ever called upon to endure, is believed to be due, in many instances, to an excess of lime and magnesian salts in the drinking water.

Cause of Goitre.—The swelling of the thyroid gland in the neck, producing the repulsive deformity of Goitre, or Derbyshire neck, seems to be intimately connected with mineral impurities in water. In Nottingham, England, where this disease is not unfrequently met with, the common people attribute it to the hardness of the water, and in other parts of Great Britain it is found to prevail only, or at least especially, in those districts where the magnesian limestone formation abounds.

Goitre in Switzerland.—Dr. Coindet, of Geneva, Switzerland, asserts that Goitre is speedily produced in persons who drink the hard pump-water in the lower part of that town, whilst in other parts of Switzerland the use of spring-water has been followed by the development or augmentation of Goitre in a very few days. In India also it has been shown conclusively to prevail, to any marked extent, only where the magnesian limestone rocks underlie the soil; but whether it is the lime and magnesian salts, or whether, as has been suggested, it is the presence of sulphide of iron in the bed-rock formation, which is the direct cause of the development of Goitre, has not yet been positively determined. It appears certain, however, that Goitre is originated by some water impurity, and that this contamination is of an inorganic and not of an animal or vegetable nature.

Organic Impurities in Water.—A small quantity of organic matter of vegetable origin, that is to say, an amount not exceeding three grains to the gallon, is not generally found to be injurious, but even very minute quantities of organic material of *animal origin,* especially if this material is composed of the waste matters, such as urine or excrement, from man or animals, is the great cause of unwholesomeness of water. Probably one-fourth of the sickness and death in civilized communities arises directly or indirectly from this one cause, and, unfortunately, even when we are fully forewarned of this imminent danger to health, it is exceedingly difficult, in most thickly populated places, to secure a source of water supply with which sewage has not been mingled.

Effect of Metallic Impurities.—The effects of minute traces of metallic substances in drinking water have not yet been ascertained with sufficient accuracy, but it is quite possible that the entire sanitary condition of a district may depend in some measure upon impurities of this description. Mr. Wanklyn suggests that the well-known salutary effect of what is called change of air may be, in reality, partly due to the escape from some extremely small metallic impurity in the water of the section of country from which removal takes place.

Cause for Bright's Disease.—It has long seemed probable that the increasing prevalence of that terribly fatal malady, "Bright's disease," especially in cities and large towns, may be due to the poisonous effects of exceeding minute quantities of lead, dissolved from the lead pipes so generally employed as service-conduits, notwithstanding the protective coating which usually forms so promptly upon them.

Lead Poison in Water.—These are probably very common throughout our whole country, and, contrary to what at first sight might be imagined, it is likely that lead much more frequently and seriously affects the health of people inhabiting small villages and country houses, than that of residents in cities, notwithstanding the latter constantly use water which is brought into their houses through long lines of lead service-pipes. The explanation of this seeming paradox is that river-water, which is that usually supplied to citizens, contains in almost all cases a small amount of the sulphate of lime, sulphate of magnesia, or some other compound of sulphuric acid, which, when brought in contact with the lead pipes, is decomposed, and the resulting sulphate of lead which is formed has the happy faculty of clinging to the inside of the pipes where it is produced, and thus constituting an insoluble lining, which not only protects the tube from further corrosion, but also, what is of far greater importance from a sanitary point of view, prevents any further contamination of the drinking water which flows through the conduit.

Lead Poison in Rural Districts.—In rural districts, on the other hand, wherever rain-water is used for drinking purposes, it is exceedingly liable to be contaminated with lead from lead-lined cisterns, lead service- or collection-pipes, lead roofs, or from the solder of tin roofs. As a rule, the purer the rain-water, the greater is its action on lead with which it stands in contact; hence, therefore, the presence of a minute quantity of some salt of sulphuric acid in water is of very great importance, and serves as an invaluable protection against lead-poisoning to the human beings and animals who may employ it for drinking purposes.

How Lead Poisons Water.—When pure water recently boiled is placed in, or run over, lead, no action takes place; but if the water, after being boiled, is exposed for a short time to the air, from which it absorbs oxygen and carbonic acid, and is then brought in contact with lead, we soon find that a whitish film, which on chemical examination is found to be composed of the carbonate of lead, is formed upon the metallic surface. This whitish film, which easily separates from the lead on which it appears, and becomes mechanically mixed with the water, is very poisonous. Since, as already mentioned, rain-water contains usually some nitric acid, in addition to the oxygen and carbonic acid which it absorbs from the air, and this nitric acid combines with lead to form a very soluble and poisonous nitrate of lead, it is much more dangerous than even pure aerated water, after standing for a short time in contact with a leaden surface. Rain-water intended for drinking or cooking purposes ought, therefore, never to be collected from lead or tin roofs, transmitted through lead pipes, nor under any circumstances stored in lead-lined cisterns of any kind.

Virulence of Lead Poison.—In the celebrated case of the accidental poisoning of the ex-royal family of France, at Claremont, by lead which was taken up in the drinking water, the amount was found not to exceed one grain of metal to the gallon of water. From cases which have since been observed, it would appear that the habitual use of water containing one-tenth or even one-twentieth of a grain per gallon, is sometimes attended with danger. In his investigation into the cause of that curious disease, as it was formerly considered, the Devonshire colic, Sir George Baker, who discovered that it was only a form of lead-poisoning due to the drinking of cider fermented in lead-lined vats and troughs, found that eighteen bottles of cider he examined contained four and a half grains of lead, or a quarter of a grain to each bottle.

Lead Palsy.—Under some special circumstances, not at present well understood, extremely minute amounts of lead in water may prove injurious. Thus, for example, Dr. Angus Smith speaks of cases in which lead-paralysis, or palsy, was apparently produced by water containing only one one-hundredth of a grain of lead to the gallon.

Detection of Lead in Water.—The method of detecting the probable presence of lead in a sample of drinking water is so simple that every reader is advised to take the first opportunity of examining their own water-supplies, and so making sure that they or their families are not liable to the insidious dangers of lead-poisoning. In order to determine whether a water is contaminated with lead, all one has to do is to drop

two or three drops of the solution of sulphide of ammonium into the suspected fluid, contained in a white bowl or large cup, and observe whether a brownish or yellowish coloration is produced. If the liquid remains perfectly clear and colorless you may be sure that it either contains no lead, or that such a metallic impurity is present in a quantity of less than one-tenth of a grain to the gallon, an amount which is not generally injurious to health. If, however, a slight brownish tint is produced in the water which is being tested, it must not be too hastily condemned as poisoned, since either copper or iron might give rise to the same coloration with the reagent. Such a suspicious water ought, however, to be promptly analyzed by some good analytical chemist before being employed for either cooking or drinking purposes any further.

Applying the Test for Lead.—The sulphide of ammonium may be purchased at a small cost, say for twenty-five cents an ounce, of most dealers in chemicals; and, as its odor is extremely disagreeable, it should be kept carefully corked until the moment it is used. The experiment should be made upon half a pint of the suspected water; and, if the contamination is supposed to be caused by lead pipes, it is a good plan to test a portion of the liquid which has stood over night in the conduits. The mode of discriminating the precipitate caused by iron from those due to the dangerous metals, lead and copper, is to let fall a few drop of hydrochloric acid, called also muriatic acid, into the fluid. If the brownish or yellowish-brown tint disappears, we may know that innocent iron is the only metallic impurity; whilst if, on the contrary, no change is effected by the addition of the acid, one of the poisonous metals, lead or copper, is present. No water, however, in which the slightest tinge is produced by adding the sulphide of ammonium, should be swallowed by man or beast until a rigid investigation by a competent water-analyist has proved it to be harmless.

Difficulty of Obviating Lead Poisoning.—Attempts have been made to obviate the danger of water contamination from lead pipes in various ways, but not as yet with complete success. In some instances the pipes have been lined with other metals, such as tin or zinc; but, at least in some instances, a galvanic action has thus been set up, which corroded the conduits with great rapidity, and probably led, therefore, to still more dangerous pollution of the water supply. Coating the pipes on the inside with coal-tar, bituminous varnish, solution of gutta-percha and of India-rubber, have also been experimented with, as yet with but partial success.

Lead Diseases.—The injurious effects of lead upon the human system

are displayed first, in the production of dyspepsia; later, obstinate constipation and a peculiar kind of colic, so common among painters from the influence of lead that it has received the name of "painter's colic;" and finally, disturbance of the nervous system, especially that peculiar form of lead-palsy called wrist-drop, in which the power to lift up the hand is more or less completely lost.

Iron in Water.—The presence of iron in a water, rendering it what is called Chalybeate, from the old Greek name for iron, renders it to many persons only a useful tonic, but in some people it causes severe headache and serious disturbance of the digestive organs.

Arsenic in Water.—Arsenic, copper and mercury are rarely found in drinking waters in America, except in streams flowing near chemical works, or unless they are introduced designedly with some murderous intention. These metals may, therefore, be practically ignored in the consideration of water from a hygienic point of view.

Infectious Diseases from Impure Water.—The principal acute diseases which are due to impure water are Cholera, Typhoid Fever, Diarrhœa and Dysentery; and, although it is only within a comparatively recent period that mankind has begun to realize its dangers from this source of these maladies, the accumulated evidence is already very conclusive.

Cholera Due to Impure Water.—Among the remarkable outbreaks which go to prove that this mode of cholera propagation is not at all uncommon, may be mentioned the following, condensed from Mr. Simons' eighth report as medical officer of the English privy council, during the prevalence of cholera in England in 1865: A gentleman and his wife from the village of Theydon-Bois, in Essex, had been lodging at the town of Weymouth for two or three weeks, and returned home towards the end of September. On their way home they passed through Dorchester, where the gentleman was seized with diarrhœa, vomiting and cramps, which continued more or less during the next day and the day following, when he reached his own home. During the journey the wife also began to complain of pains in the abdomen, which was followed by diarrhœa and eventually by cholera, from which she died.

Cholera Infection.—A few days after their return the same terrible disease rapidly attacked other members of the household, so that, within a fortnight, in that one little circle, eleven persons had been seized with cholera, including the mother, father, grandmother, two daughters, son, doctor, serving-lad, serving-maid, laborer and country-woman, and of these eleven only three survived, namely, the son, a daughter and the

serving-lad. Later, in the country-woman's family, there was another fatal case. It cannot well be doubted, concluded Mr. Simon, but that the exciting cause of this succession of events was in some way or other the return of the parents from Weymouth—of the father with the remains of choleraic diarrhœa upon him, of the mother with apparently the beginnings of the same complaint. But this is only part of the case, and the remainder teaches a most impressive lesson. All the drinking water used in the house came from a well beneath the floor of the scullery, and into that well there was habitual soakage from the water-closet.

Another Case of Infection.—Another famous illustration is found in the history of the "tea-water pump" of Broad street, near Golden Square, London, which during the cholera visitation of 1854, killed nearly 500 persons in a single week, in one of the fashionable localities of the city. It has long been known that water containing five or six grains of lime and magnesia to the gallon is much to be preferred for making tea to water of any other quality. This is because the lime precipitates the astringement matter of the leaf, yet does not interfere with the solution of the desirable constituents; and hence certain wells which have this proper proportion of mineral matter come to be valued very highly by persons of nice taste.

The Famous London Pump.—At any rate, the Broad street pump had in London the reputation of furnishing, in its cold sparkling waters, a better medium for "the cup which cheers but does not inebriate," than was elsewhere to be found. When the cholera invaded this neighborhood the wealthy resident retired to the fashionable suburbs which were still uninfected; but, to the surprise of many, the cholera broke out among them with terrible severity. The health officers soon discovered, however, that those who were attacked had sent in every day to their favorite Broad street pump for their water-supply, and, by removing the pump-handle, they quickly put an end to the epidemic.

Avoiding Cholera.—A first and highly important warning, therefore, which these and many other similar occurrences give us is never to drink any water which, by any possibility, could have become contaminated with the smallest particle of discharge from the bowels of a person suffering from cholera or choleraic diarrhœa.

Typhoid Fever from Polluted Water.—The remarks which have been already made with regard to the influence of impure water on the spread of cholera, apply still with greater force to the causation of typhoid fever. So common is this mode of propagation that the assertion may be ventured

that few readers of these pages have not lost some near relative or beloved friend from this dreaded disease arising in this way, although the true source of the infection was perhaps, at the time it occurred, quite unsuspected.

Spread of Typhoid.—Sir William Jenner, than whom no higher medical authority could well be quoted, in commenting upon this point, says: The spread of typhoid fever is, if possible, less disputable than the spread of cholera by the same means; solitary cases, outbreaks confined to single houses, to small villages and to parts of large towns, cases isolated it seems from all sources of fallacy, and epidemics affecting the inhabitants of large though limited localities, have all united to support, by their testimony, the truth of the opinion that the admixture of a trace of excrement, but especially of excrement from a typhoid-fever patient, with the water supplied for drinking purposes, is the most efficient cause of the spread of the disease, and that the diffusion of the malady in any given locality is limited or otherwise, and limited just in proportion as the dwellers in that locality derive their supply of drinking water from polluted sources.

Deadly Effect of Water Impurity.—According to the late Dr. William Budd, it also appears to be highly probable that, when the poison of typhoid fever enters the system by drinking water, infection is much more certain than when it is disseminated by the air and is breathed into the lungs. In support of this statement, he instances an outbreak which occurred in Wales, where out of ninety or a hundred persons who attended a ball, fully one-third was shortly afterward laid up with fever. Although the water was not examined, there was satisfactory reason to believe that it was polluted with sewage.

Typhoid Poison from a Well.—In a report of the American Public Health Association, Dr. Austin Flint gives an account of an outbreak of typhoid fever in Vermont which it was possible to trace, in the most circumstantial way, to the poisoning of a well in some such method as has been described. A young man traveling through that region by stage-coach was taken ill, and, when he could go no further, was left at a tavern in a little hamlet to be cared for, his illness soon proved to be typhoid fever. A small watercourse, in a shallow valley, divided the village into two portions, each of which consisted of half a dozen houses or less. In a few days new cases of the fever made their appearance in that part of the hamlet to which the tavern belonged—every house,

in fact, but *one* was invaded with this disease—whilst on the other side of the stream not a case occurred. It appears that the tavern well, which was the only one upon that side of the village, furnished the water-supply to all the families belonging there *but one*. That one family had had a quarrel with the landlord of the hotel, had consequently deserted the tavern well for a more distant supply of drinking water, and so escaped swallowing the specific poison of typhoid fever in the water by which all their neighbors were stricken down.

Typhoid from Milk.—It has also been proven in late years that typhoid is transmitted from infected milk, cows have been allowed to drink from streams that have had the discharges from typhoid patients thrown into them. The germs have been taken into the cows and finally into the milk. This milk was distributed to families and in many cases caused typhoid.

Proximity of Privy and Well.—Unless privy and well be located at considerable distance from each other, and further unless the nature of the ground be such that the flow from the privy will be away from the sources of the well, there is always grave danger of the pollution of the well water with germs from the privy. This also applies to nearby stable yards. There are many authenticated cases of typhoid which have been directly traced to the proximity of wells to privies and stables, and the danger should not be underestimated.

Danger in Farm-houses from Polluted Water.—Of course, the same conclusion holds good for country farm-houses or dwellings when, from motives of convenience, although there is space enough and to spare, but a short distance is interposed between the sides of the hole which is called the well, and which furnishes the drinking water, and the other hole nearby which is called the cess-pit, and used as a receptacle for filthy, often poisonous, excrement. Moreover, there are no doubt many instances where, owing to the inclination of beds of sand or gravel, strata of rock and so forth, impurities of these and other dangerous varieties may be carried, by underground currents, much further than the distances which have been mentioned as measured upon the surface of the earth. In other words, a cess-pool on a hill-side, 500 feet or more away from a well, may infect the water of the latter, if underground currents favor such contamination.

Diarrhœa and Dysentery from Impure Water.—The instances of outbreaks of these two diseases from contaminated water-supply are very

numerous, and probably most persons can recall examples of this kind. The impurities which produce diarrhœa and dysentery are suspended earthy matters, such as are found in most river-waters after a rain; suspended animal and vegetable material; sulphates and chlorides of lime and magnesia, and nitrates of ammonia and of lime. Besides the numerous outbreaks traceable to direct sewage contamination, there are several instances recorded of indirect poisoning of a water-supply from this source, as in the following curious case.

Outbreak at Salford Jail.—In the Salford, England, jail there was a sudden outbreak of diarrhœa of a choleraic type, which affected more than half of the prisoners; while of the officers and their families, who were distributed throughout the building, not one was attacked. The food of the convicts was examined and found to be good; it was evident, also, that the air did not contain the cause of the disease, because both classes above mentioned were under the same conditions in that respect. Suspicion was therefore directed to the drinking-water. It was then discovered that, though the water supplying all parts of the prison was derived from the same source, there was one cistern for the use of the officers, and another covered cistern for furnishing to the prisoners their allowance, and that the untrapped overflow-pipe of the latter communicated with an open sewer. On the day of the outbreak of diarrhœa in the jail, the water from this cistern was observed to be colored and to taste unpleasantly.

Sewer-Gas Poison.—It had obviously absorbed sewer gas, which had ascended through the overflow-pipe, and that this had been the real cause of the disease was indicated by the fact that the diarrhœa disappeared almost as rapidly as it had broken out, when the cistern was emptied and the pipe efficiently trapped.

Diarrhœa in Country Districts.—Dr. Wilson declares that, according to his experience, much of the diarrhœa which prevails in country districts during the summer and autumn amongst children is due to polluted water, drank either as it is drawn from the well or when mixed with milk, fraudulently or by accident.

Impure Ice as a Cause of Diarrhœa.—The fact that ice is now used by almost all classes to an extent which entitles it to rank rather as a necessity than, as formerly, as a luxury of life, renders it important that its purity should be as jealously guarded as the water-supply. It is popularly believed that water frees itself from dangerous organic matter, as it does to a great degree from certain saline contaminations during the process of

freezing, and also that the vegetable or animal germs of typhoid and other fevers are killed, or at least rendered sterile, by congelation of the water in which they exist. Both these ideas are, however, unquestionably erroneous, as has been repeatedly proved by the various experiments which ignorant hotel-keepers try without the least intending it, upon their guests, on a scale which would make the boldest vivisector stand aghast before the suffering inflicted, even if it were only upon the brutes which form the subjects of his researches.

A Case of Impure Ice Poison.—Such was notably the case in an epidemic of intestinal disorder which occurred at the watering-place of Rye Beach, N. H. From the account of Dr. Nichols, who attended most of the patients, it seems that, early in the season, a mild form of disturbance of the stomach and bowels made its appearance among the guests of a particular hotel at this favorite summer resort. The symptoms were in general giddiness, nausea or vomiting, diarrhœa and severe abdominal pain, accompanied by fever, loss of appetite and mental depression. The well and drainage system of the establishment, which had recently been put in complete order, was found almost faultless, and the milk-supply of unquestionable purity; but on the attention of the physician being directed to the stock of ice provided for the guests, conclusive proof of its dangerous quality was promptly obtained.

The Contaminated Ice Pond.—Both the house in which the ice was stored and the water from the melted ice gave off a decidedly disagreeable or even offensive odor. Finally, a visit to the pond from which the ice had been gathered disclosed the fact that much of the water in it was dark-colored, foul and highly contaminated with filthy marsh-mud and decomposing saw-dust. Chemical analysis showed that both it and the suspected ice contained a large excess of organic and volatile impurities, including four one-hundredths of a grain per gallon of albuminoid ammonia.

Fever Germs in Ice.—In Connecticut, the Board of Health informs us that, in several instances, attention has been drawn to sewage-contaminated ponds with ice-houses upon their borders, and that several isolated cases of typhoid fever, and one death, from the free use of ice polluted by sewage, had been recorded in that State. The curious natural experiment of the United States steamship Plymouth, elsewhere detailed, shows conclusively that fever germs are not infallibly destroyed by a freezing, probably not by a zero temperature, and contributes

its share of proof that impure ice, especially when gathered from ponds polluted by sewage, may constitute a prolific cause of disease.

Dangers in Snow-Water.—Snow-water, pure and fresh as it seems whilst flowing in the sparkling streams which descend snow-capped mountains in our Western States, may be very dangerous to health in consequence of organic impurities contained in it. Mountaineers, to whose long observation and experience in the wilds some attention is due, attribute the origin of the so-called mountain fever to the melting of snows and the drinking of snow-water.

Mountain Fever Due to Snow-Water.—This disease is apt to prevail in the Rocky Mountains in the spring, that is, during May and June, when the ice in the streams breaks up and the snow commences melting. In one instance, out of a party of 367 officers and men, 110 were affected with mountain fever in a few weeks after commencing to drink snow-water, which is described by the medical officer attached to the expedition as being cold, clear and perfectly free from the alkaline taste generally found in waters of that region.

Ague from Impure Water.—Although the poison of fever and ague is probably, as a general rule, conveyed into the human system by the bite of mosquitoes, some cases seem to show that it may also enter the body by drinking water.

Diarrhœa Outbreak from Impure Water.—As general conclusions in regard to contaminated water, it may be stated that: 1st. An outbreak of diarrhœa arising in a community is almost always owing to impure air, impure water, or bad food. If it affects a number of persons suddenly it is probably due to one of the last two causes, and if it extends over many families, almost certainly to water. But, as the cause of impurity may be transient, it is not always easy to find experimental proof.

Dysentery Outbreaks from Impure Water.—2d. Diarrhœa or dysentery constantly affecting a community, or returning periodically at certain times of the year, is far more likely to be produced by bad water than by any other cause.

Cholera Outbreaks from Impure Water.—3d. A very sudden and localized outbreak of either typhoid fever or cholera is almost certainly owing to the introduction of the poison by water.

Malarial Outbreaks from Impure Water.—4th. The same statement is true in cases of ague or malarious fever; and, especially if the attacks are serious, a possible introduction by foul water should be carefully inquired into.

Worms from Impure Water.—5th. The introduction of the eggs of some of the intestinal worms, by means of drinking water, is proved in some instances and rendered highly probable in many others. People residing in districts where shallow-dip- and draw-wells are in common use, seem to be particularly subject to parasitic worms in the bowels.

Pure Water a Sanitary Necessity.—6th. Although it is not possible at present to assign to every impurity in water its exact share in the production of disease, or to prove the precise evil influence on the public health of water which is not extremely impure, it appears certain, says Dr. Parkes, that the health of a community always improves when an abundant and pure water-supply is given; and, apart from this actual evidence, we are entitled to conclude from other considerations, that abundant and good water is a primary sanitary necessity.

Rocks Yielding Pure Water.—As a general guide to the water impurities that may be expected in waters from the various geological formations enumerated, the following condensed summary of the best known facts, as given by Dr. Parkes, will prove useful. The granitic, metamorphic, trap-rock and clay-slate waters are generally very pure, often not containing more than from two to six grains per gallon of solid matter, which is chiefly made up of carbonate and chloride of sodium, with a little lime and magnesia. The organic matter is very small in amount usually, but shallow wells in disintegrated trap-rock may, of course, be fouled by surface washings or soakage. The water from millstone grit and hard oolite is also very pure, sometimes containing only four grains per gallon of mineral matters, which comprise the same saline materials as are found in granitic waters, with the addition of sulphates and a trace of iron.

Rocks Yielding Impure Water.—Soft sand-rock waters, on the contrary, are often impure, containing much sodium chloride or common salt, sodium carbonate, sodium sulphate, iron and a little lime and magnesia, amounting altogether to from thirty to eighty grains per gallon. The organic matter may also be abundant; that is, to the extent of from four to eight grains to the gallon, or even more. Occasionally, however, these waters are quite pure.

Sand and Gravel Waters.—The loose sand and gravel waters also vary much in their composition, and in tolerably pure gravels, not near towns, the water is often very free from contamination. In many sands, which are rich in salts, the water percolating through them is, of course, much affected, the dissolved solids amounting sometimes to seventy grains per gallon, and consisting of sodium chloride, sodium carbonate, sodium sul-

phate, with calcium and magnesium salts, and a good deal of organic matter. The water from the sandy plains of southern France is said to contain enough organic matter to produce ague in those who drink it.

Chalky Waters.—The typical "hard" water, from chalk formations, is very sparkling and clear, highly charged with carbonic acid, and contains from seven to twenty grains of calcium carbonate, a little magnesium carbonate and sodium chloride, with small and immaterial quantities of iron, silica, potassa, nitric, sulphuric and phosphuric acids in combination; organic matter is usually in small amount, and is therefore a good, comparatively wholesome and pleasant water, which, though hard, softens greatly by boiling.

Limestone Waters.—The waters from limestone and magnesian limestone regions are also clear, sparkling liquids, of agreeable taste, but they differ from the chalk waters in that they contain usually more calcium sulphate, the sulphate of lime or gypsum, sometimes to the amount of twelve grains per gallon, and in dolomitic districts much magnesium sulphate and carbonate. They are not so wholesome as the chalk waters, are hard and soften less on boiling.

Clay Waters.—The water of clayey districts is chiefly surface, and soon runs into converging streams. They often contain much suspended matter in the form of mud, but few dissolved constituents. Waters from the mixture of sand and clay brought down by the rivers, perhaps of former ages, and called Alluvium, are generally impure.

Alluvial Waters.—The alluvial waters contain calcium carbonate and sulphate, magnesium sulphate, sodium chloride and carbonate, iron, silica, and often much organic matter, the total amount of solids reaching 120 grains or more. Occasionally the organic matter oxidizes rapidly into nitrites, and, if the quantity of chloride of sodium is large, it might be incorrectly supposed, from analysis, that it was contaminated with sewage.

Surface Waters.—Surface and subsoil waters are often highly impure, and, although very variable in composition, are always to be regarded with suspicion until proved to be safe.

Soil Waters.—Some soils contain potassium, sodium and magnesium nitrates, and give up these salts in abundance to water which soaks through them. In towns, and among human habitations, the surface and shallow-well water is often very unsafe, as already explained. It may contain large quantities of calcium and sodium nitrates, nitrites, sulphates, phosphates and chlorides. Organic matter exists often in large amount and slowly oxidizes, forming nitric acid and ammonia.

Marsh Waters.—Marsh-water always contains a large quantity of vegetable organic matter, it being not unusual to find from twelve to forty grains per gallon, and sometimes even more. Suspended organic matter is also common, but the amount of saline impurity is very variable.

Poisoned Waters from Graveyards.—In water from graveyards, ammonium and calcium nitrites, and sometimes fatty acids, with much organic matter of animal origin, are met with. The water of a well at St. Didier, France, more than 300 feet from a cemetery, was found to be largely contaminated with ammoniacal salts and organic matter, which was left on evaporation. The water was clear at first, but had a vapid taste ad speedily became putrid.

Artesian-Well Waters.—Artesian-well water varies greatly in composition, being so highly charged with saline matter sometimes that it is quite undrinkable. The artesian well at Grenelle, France, contains enough sodium and potassium carbonates to render it alkaline to the taste, although it is used for the water-supply of the town. In some cases artesian-well water contains an appreciable amount of iron; in other instances, when drawn from the lower part of the chalk formation, or the green sand below it, it is tolerably pure. The temperature of the water is usually high in proportion to the depth of the well. Thus, for example, a well at Louisville, Kentucky, bored to the depth of over 2000 feet, discharges an immense volume of water, the temperature of which is 75 degrees Fahrenheit. The amount of air in the water of deep artesian wells is often small, and this circumstance, with the frequently elevated temperature and high degree of saline impregnation, is apt to make such wells very unsatisfactory as sources of water-supply.

Seashore-Well Waters.—Lastly, water from wells near the seashore is apt to be brackish and objectionable on that account, even though it does not contain much organic matter. Dr. Parkes mentions one instance where a bored well, 150 feet deep, near the sea, yielded water impregnated with 500 grains of solids, including 380 grains of chlorides, per gallon.

THE DETECTION OF CONTAMINATED WATER.

Vigilance Over Drinking Water.—As a general rule, the examination of drinking water, in order to determine its purity, and consequent safety as a beverage, involves a chemical and microscopical analysis, which should always be made when circumstances permit. Moreover, it must not be forgotten that water which is usually pure and wholesome, may be at any

time polluted by the fouling of its source during heavy rains, the occurrence of floods, the alteration in the customary course and flow of sewage, manufacturing refuse, and so forth, above or below ground. Constant vigilance over the condition of the water-supply is, therefore, exceedingly necessary to health; but as complete investigation requires the skill of a professed analytical chemist, those methods of examination need only be described in detail which are especially used as giving us warning of danger, with a few of the simpler tests.

Character of Water Tests.—For hygienic purposes, then, we examine water in order to discover whether it contains any suspended or dissolved ingredients which are likely to be hurtful. Some saline materials often found in water, as already mentioned, are not injurious when present in small quantities only, whilst others, consisting of or resulting from putrefying animal matter, are at once recognized as very dangerous to health. In any instance, reliance must not be placed upon the results of single tests, but all the circumstances of the case must be searched out and carefully considered.

Green Waters.—Green waters generally owe their color to vegetable matters, chiefly microscopic plants, and are usually harmless, although certain bluish-green plants of this kind give rise to the disagreeable smell popularly denominated the pig-pen odor, and probably render the fluid unwholesome as well as disgusting.

Yellow Waters.—Yellow or brown waters are the most to be feared, as their color is often due to animal organic matter, such as sewage. It is sometimes the case, however, that a yellow or brown tint is due to decomposed vegetable material, such as peat, or decayed wood, and the fluid is then merely unpleasant and not hurtful. Water is also occasionally colored in this way by some salt of iron, although in most instances the metal is precipitated as oxide of iron in the sediment.

Microscopic Tests.—The lustre or brilliancy of a water, which is recommended as a good test as to the amount of air which a specimen contains, can readily be judged by the eye; but the only satisfactory examination of the sediment must be made with the microscope, which ought to have a power of about two hundred and fifty diameters, although even an instrument of half that capacity will often reveal much of interest and importance in the deposit of a suspected drinking water.

Taste Not a Good Water Test.—The taste of a water is a very uncertain indication in regard to wholesomeness. Of course, any badly-tasting water ought at once to be rejected, but some very agreeable waters, as far as

their tastes are concerned, have proved to be dangerously contaminated with sewage of the vilest character. And yet many people are to be found all over the country who think that if a water is bright and clear it must be good; nay, if it is the drinking fluid of their own wells which is called in question, they will often indignantly resent the faintest suggestion that it can possibly be in the least degree injurious to health. As remarked by Dr. Fox, however, such cases as that of the servant who, coming from an obscure village near the Dartmoor, in the southwest part of England, objected to the pure water of a distant town where she was in service, because it was devoid of both taste and smell, are becoming rare.

Where Taste Test Fails.—As regards dissolved mineral matters, taste is of little use, and differs in different persons. On an average, common salt is not recognized until it reaches the quantity of seventy-five grains per gallon, whilst carbonate of lime is perceptible when dissolved in a water to the amount of ten grains per gallon; iron, however, can be recognized by its astringent flavor in very small quantities, occasionally as minute an impregnation as two-tenths of a grain per gallon may be thus detected. A permanently-hard water has sometimes a peculiarly insipid or slightly saline taste, if the total salts amount to thirty-five or forty grains per gallon and the sulphate of lime or gypsum to six or eight grains.

What Taste of Water is Due to.—The taste of good drinking water is due entirely to the gases dissolved; water nearly free from the hardness of carbonate of lime, held in solution by carbonic acid, such as distilled water, is not so pleasant as the brisk, highly-carbonated waters; it may be called flat, but it is difficult to define the kind of taste or the absence of it.

Rules for Pure Water.—Although the general characters of a water, when examined as directed above, give only an imperfect idea of its value, they are yet important when no other investigation can be made. If the water be colorless, clear, free from suspended materials, of a good lustre, yet not too brilliant, devoid of smell and taste, except such as are recognized as characteristic of a safe and usable water, we shall in a majority of cases be justified in pronouncing it a wholesome drinking fluid; whilst, according to the degree in which it deviates from these characteristics, will we proportionately be sustained in regarding it with grave suspicion.

Chemical Tests the Best.—Visible suspended matter is probably often the most dangerous, although there is little doubt that the microscopic germs of various diseases may exist in small aggregations without being recognizable at all by the naked eye of even the most practised observer;

and, of course, the metallic impurities, such as lead and copper, for detecting which rules have already been given, must often escape discovery by any examination which does not include the application of chemical tests.

Nessler Test of Water.—The one of these chemical reagents which it would be well to apply in every instance where it is possible to do so, is the "Nessler's test," an ounce of which may be procured from almost any good chemist for twenty or twenty-five cents. It constitutes a test for the products of decomposing animal matters, especially sewage materials, including human and animal excrement, and is, therefore, capable of giving timely warning against the most dangerous of the common pollutions of drinking waters.

The Ammonia Test.—In the whole round of chemical analysis there is no determination which surpasses that of ammonia from putrefying animal matter by this method in point of delicacy. It is questionable whether any other approaches it. The Nessler reagent is said to be capable of indicating one part of ammonia in twenty million parts of water, and even this assertion, surprising as it may seem, is given as an understatement of the delicacy of the test. Such being the characteristic of this way of calculating the ammonia, the great advantage of causing determinations of organic matter to depend on measurements of ammonia will be manifest to every one.

Form of the Nessler Test.—In order to make use of this reagent, fill an ordinary wine-glass or small goblet which will hold from two to four ounces, nearly full of the water it is wished to examine, and add three or four drops of the Nessler's solution. If a yellow or brown color, or a brownish precipitate, be produced, the water contains ammoniacal salts. As a rule, this should be regarded as a very suspicious circumstance, and should the coloration be well marked, it is almost sufficient of itself to condemn the water for drinking purposes. If a milky or curdy precipitate is also formed, it shows that the fluid is a hard water, and more or less unfit for washing. Should this whitish precipitate be excessive, it hides to a certain extent the yellowish color indicative of ammonia, so that it is necessary to take a fresh sample of the water, add to it a few drops of strong solution of caustic potash or soda, and after the precipitate of lime which is thus caused to fall has subsided, test for ammoniacal compounds with the Nessler's reagent.

The Soap-Test of Impure Water.—Clark's soap-test for determining the hardness of water is prepared by dissolving a small quantity of soap,

say one ounce in half a pint of a mixture of equal parts of alcohol and water. It is used by dropping it into a measured quantity, such, for example, as an ounce of the water to be tested, until the fluid when shaken begins to form a beady lather—the relative number of drops required to produce this effect nearly indicating the comparative degrees of hardness of the waters undergoing examination.

Water Test Should Always be Made.—This soap-test may be used to decided advantage in all "hard-water" districts, and every one should test his water-supply at the earliest opportunity, with it, with the Nessler's reagent for organic ammonia indicating pollution by sewage, and with the sulphide of ammonium for contamination with lead. And the application of these two latter tests is important, even although the drinking water in question has been in use for a long time by various members of a family without apparent injury, for many instances are on record in medical books where chronic derangements of health have been due to impurity of the water taken into the stomach, and yet this source of injury has been entirely unsuspected until a chemical examination of the water-supply has revealed the insidious origin of the trouble.

Water Precautions for Travelers.—A wise precaution when traveling, especially in unhealthy districts or during an epidemic of any kind, is to drink none but boiled rain-water, which you can make sure has not been exposed to contamination by lead pipes, roofs or cisterns. To be effectual, the boiling ought to be continued briskly for half an hour or longer. Rain-water is preferable in limestone regions, because the hard water containing lime is partially or not at all improved in this respect by boiling, and gives rise to serious diarrhœa in many of those unaccustomed to its employment. Such hard water is also probably one great cause of the very painful calculous disorders.

HYGIENIC USE OF BATHS.

Temperature of Baths.—Coming now to the detailed consideration of water as applied to the human skin in the form of a bath, in order to accomplish the important hygienic purposes described, it is obvious, in the first place, that temperature has a powerful influence in this respect.

Cold Baths.—The range of the cold bath varies more than that of any other kind, extending, as it does, from 84 degrees Fahrenheit down to 33 degrees of the same scale. The lower temperatures included between these limits would, of course, test the endurance of even the

strongest to encounter safely the severe shock which is generally produced by the sudden application, and still more the prolonged immersion of the body in a water so near its freezing-point; but from 84 degrees to 74 degrees the reaction required is so slight that few persons who are not actually invalids are too feeble to manifest it.

First Effect of the Cold Bath.—A shock is experienced throughout the whole nervous system, more or less severe, according to the lower or higher temperature of the fluid, and the contracting effect of the cold aids the spasmodic contraction occurring in the small blood-vessels to drive the blood to the inner portions of the body, and allow the surface to become quickly chilled.

Second Effect of the Cold Bath.—But if the cold is not too severe, or the individual is not exhausted by fatigue, or enfeebled by disease, a change in these conditions promptly manifests itself soon after leaving the bath, especially if the skin is rapidly dried by friction with some absorbent substance. The heart and pulse return to their normal rate of movement, the nervous system recovers from the shock which it has undergone, the blood flows back to the surface of the skin, and a glow of renewed warmth is felt throughout the entire body.

A Guide to Cold Bathing.—This agreeable change in the condition of the circulation and the sensations is called the *reaction,* and constitutes our very best guide to the employment of cool or cold bathing. If the water of a bath has been colder than is adapted to the strength of an individual's constitution, reaction comes on but slowly, and several hours may elapse before the natural balance of the circulation is fully restored. In such a case, the hands, feet and nose remain chilly, and also cold to the touch of another person. The fingers, lips and indeed the whole face, has a bluish tint, and a more or less shrunken appearance. The pulse continues weak and slow, and languor and feebleness characterize all the movements. Of course, the method of deriving the greatest amount of benefit from these indications is for each person to cautiously test the power of his system to establish reaction, commencing with a bath of 70 degrees or 65 degrees, and gradually descending the scale of the thermometer, as he finds he is able to fully react from the depression produced by venturing among its lower depths.

Time for Cold Bathing.—It is recommended by some authors to resort to cold bathing either about an hour before breakfast in the early morning, or else late in the evening just before retiring for the night. The early morning bath of this kind may do very well for some few people of un-

usually vigorous constitutions, but as a general rule the evening is a better time for such a test of strength; and for many persons the middle of the morning, that is to say, about three hours after breakfast, when the first meal of the day has been nearly all digested, and the system is fortified thereby to bear the shock and establish the necessary reaction after it, is decidedly preferable to any other period of the twenty-four hours.

When to Avoid Cold Baths.—Under no circumstances should a cold bath be indulged in either immediately before or immediately after a meal, on account of the tendency which its inevitable shock will have to produce more or less disturbance in the process of digestion by congesting the stomach and intestines. Nor are cold baths suitable for individuals in either extreme of life, because both in infancy and in old age the power of developing animal heat is least efficient in its operations, and the reaction is accomplished slowly or not at all.

No Cold Bath After Fatigue.—Protracted labor or exercise, whether mental or physical, if so long continued as to leave the body suffering from feelings of great weariness or exhaustion, absolutely forbid the use of the cold bath. It was under these circumstances that Alexander the Great, of Macedon, nearly perished, from plunging after a long and fatiguing march into the icy current of the river Cydnus; an imprudence which, it is said, did actually prove fatal to the German emperor, the aged Frederick Barbarossa, at the head of his crusading army, seventeen hundred years later. In adverting to this latter event an ancient author quaintly observes: "No wonder if the cold water quickly quenched those few sparks of heat left in him at seventy years of age."

Duration of the Cold Bath.—The duration of a cool or cold bath must vary very much with the temperature of the water. When very cold the period of immersion should not exceed one or two minutes, whilst with water between 60 and 70 degrees, the duration of the bath may extend to a quarter or even half an hour; in every instance, however, we must be guided by the completeness of the reaction on coming out of the water.

Friction After Cold Bath.—Energetic friction of the whole surface of the body after bathing is highly beneficial as tending to produce the necessary degree of reaction. Active physical exercise, as well as warm and stimulating drinks, likewise aid in accomplishing the same desirable result. Even when a person is accustomed to the daily use of the cold bath, any sudden reduction of strength, such as may result from intemperance in eating, an evening debauch, or excess of any kind, particularly

of the sexual powers, or even over-exertion in walking or in field-sports, will forbid recourse to it the following morning.

River-Bathing.—Bathing in rivers is even more to be recommended than that in ordinary bath-rooms during the summer season, as the gentle exercise of walking to and from the river-side, and if swimming whilst immersed in the water, promote the reaction which is so conducive to health. Evil consequences are, however, apt to result from river-bathing, if the baths are too prolonged, if too violent exertion is indulged in, or if the rays of the sun overheat the head of the bather. Dr. Bell states that he has seen continued fever, of some days' duration, and violent headache, with slight delirium, arise in boys who had thus imprudently exposed themselves.

VARIETIES OF COLD BATHS.

Cold Sponge-Bath.—There are various ways of employing water in cold bathing, according to the force of the current of fluid, the amount of surface to which it is applied, and so forth. Affusion and sponging are the mildest ways of using cold water as a bath, and there are few persons, not actually invalids, who cannot thus employ water, of moderately low temperature, with benefit. After the slight depression of the bodily warmth, produced by sponging with fluid of 60 or 65 degrees, of course but a mild reaction follows, but this is suitably proportioned to the feeble energies of debilitated persons. By a repetition of the process a greater endurance is developed, and colder water may ultimately be resorted to, with correspondingly increased advantage. The cool or cold sponge-bath is sometimes of great service in treating typhoid fever, and others of the eruptive diseases, as will be explained in the second part of this work.

The Shower-Bath.—In a shower-bath the water falls in divided streams, and thus, being generally distributed over the whole body, gives a severe shock to the system; such a one, should the fluid be of a low temperature, as only the most vigorous persons can endure.

The Cold Douche.—The cold douche differs from the shower-bath in that the water of a douche is poured upon the surface of the body in a solid column, instead of a number of small streams. It is sometimes highly efficacious in reducing the violent excitement of delirious or insane patients, but, being a very powerful agent, should be used only with caution and close watching, never in the indiscriminate way cutomary in some so-called hydropathic establishments, from which it is said that more than one sudden death has been the lamentable result.

The Bath for Old Age.—The advance into old age of those who, in the vigor of youth and maturity, have accustomed themselves to the regular use of the cold bath, does not necessarily interpose an obstacle to the continuance of the practice of bathing, provided the general health remains good. But if there be evidence of feebleness of the functions, or disorder in any one of the great systems of the body, such as the digestive apparatus, or the muscular system, so as to prevent the customary allowance of nutritious food or of exercise being taken, the cold plunge or shower-bath should be given up, and simple washing with cold water, followed by active friction, substituted in its place. Should even this prove rather too great a shock for the enfeebled powers of life, as may be evinced by want of prompt reaction subsequently, recourse to anything but the tepid or warm bath must be strictly prohibited.

The Water-Cure.—The evidence in favor of great benefit being derived in suitable cases from the so-called water-cure, in the numerous hydropathic establishments of Europe and this country, is very convincing; and, in fact, it is probable that persons generally of great mobility of temperament, who are readily excited and readily depressed, and whose nervous system is soon exhausted by either bodily or mental efforts, will often find relief in the systematic use of a moderately cool or cold bath.

Objection to Hydropathy.—The difficulty is with establishments of this kind that, being carried on as business enterprises, their proprietors are not withheld, by any philanthropic considerations, from looking at every case which applies to them with an eye to business, and recommending their particular cure to all possible patients, except where they are very sure that positive injury will result from the treatment. It is therefore advisable, in every instance, to consult some reputable physician, who is not devoted to any exclusive system or dogma of medical practice, before submitting oneself to the powerful agencies of water as applied by hydropathic practitioners.

Cold Bathing Removes Heat.—Dr. Bell judiciously remarks that there is a class of people, who suffer from a sedentary life, devotion to the desk in business, or to study, and complain of troublesome heat and dryness of the hands, and sometimes of the feet, with accelerated pulse and thirst; their appetite is not good, nor their sleep sound or refreshing. Though their systems be actually weaker than usual, yet is there morbid activity of the skin, owing, in part, to the vessels of the integument not relieving themselves by free and regular perspiration. Cold bathing, by moderating cutaneous excitement, and relieving the perspiratory organs, re-

moves the unpleasant feeling of heat and dryness; and, by sympathy, produces nearly correspondent effects on the stomach.

The Flesh-Brush and Exercise.—The use of the flesh-brush and exercise in the open air are, it may be supposed, powerful auxiliaries to the measures just recommended.

Cold Bathing for Rheumatism.—There are many persons who, though enjoying what is often called full health, are liable to colds, rheumatic pains and stitches from any slight exposure to cold or moist air. Their vascular and nervous systems are both tolerably excitable, and they are readily thrown into perspiration from even moderate exercise or warm apartments. In them it is desirable so far to regulate the functions of the skin as to moderate its stimulation, and prevent the consequent debility which follows this state. Cold bathing accomplishes this purpose, and keeps the skin in a less constant condition of excitement, renders it less liable to sweat so freely from exposure to external warmth or by active exercise, and, of course, prevents the subsequent languor and susceptibility to morbid and enfeebling agencies. It would be a great mistake, in such a case, to talk of the tonic action of cold bathing. Its beneficial operation is evinced here at a time when no stimulus or tonic is admissible, and in habits sanguine and plethoric, on which nearly similar effects with those from cold bathing would be produced by a moderate bleeding, reduction of the usual quantity of food and diluent drinks.

HYGIENIC APPLICATION OF WARM BATHS.

Temperature of Warm Bath.—When the water used for bathing has a temperature of from 92 degrees to 98 degrees Fahrenheit, it produces upon the skins of most people the sensation of warmth, and although water of this degree of heat is usually employed chiefly for cleansing purposes, yet it has hygienic properties of a sufficiently marked character to render it worthy of especial notice. Since water is a much better conductor of heat than air, and especially than confined air, as much caloric is extracted from the human body when immersed in water which is only a few degrees lower than the average human temperature, as by air of much greater relative coldness.

Effect of Warm Bath.—The warm bath diminishes the frequency of the pulse, especially when it has been greater than natural, and this effect is almost exactly in proportion to the duration of immersion. It also renders the respiration slower, and diminishes the temperature of the

body, relaxes the muscular fibre, increases the bulk of the fluids by absorption, or perhaps only by restricting evaporation from the skin, removes impurities from the surface, promotes desquamation and renewal of the cuticle, lessening the hardness of the nails and indurations of the epidermis.

Separation of Outer Skin.—The separation of the outer layers of the scarf-skin or epidermis, which may often be seen floating in small, whitish fragments upon the bath water, is due to two causes. In the first place, it is softened by the water, and so rendered more easily removable by slight friction; and secondly, it is in part pushed off by the increased fullness of the blood-vessels underneath. A humorous writer has compared the epidermis which covers the whole surface of the body to a tight shirt, and a dirty cuticle, therefore, to a dirty shirt which is gotten rid of by the aid of a bath.

Take Short Warm Baths.—A prolonged daily use of the warm bath is apt to cause eruptions on the skin similar to those which managers of water-cure establishments pronounce critical, and of the greatest advantage in certain diseases of the nervous system.

Warm Baths Soothe the Nerves.—An immediate and very agreeable effect of the warm bath is to soothe a nervously excited condition and promote sleep, which to many people is peculiarly refreshing when procured by this means.

Time to Take Warm Baths.—The best period for taking a warm bath is about an hour previous to the mid-day meal, because then the disturbance of the circulation will have time to pass off before food is introduced into the stomach, and the secretion of the gastric juice and other fluids necessary for digestion will not be thereby interfered with.

Duration of Warm Baths.—The duration of a warm bath ought not to exceed in ordinary cases half an hour, although in the warm water-cure of Leuk, in Switzerland, patients sometimes remain in the tepid fluid five hours in the morning and three hours in the afternoon, with alleged benefit. In the Leuk bath, persons breakfast from little floating tables, which afterwards serve to support books and newspapers for their amusement, and it is said that the Emperor Charlemange used to hold prolonged levees whilst immersed in his warm bath at Aix-la-Chapelle, which was supplied by one of the numerous thermal springs of that famous city.

Warm Baths in Acute Diseases.—The relaxing and soothing influence of the warm bath is an invaluable aid to the treatment of many acute diseases, and being, as a general rule, devoid of danger in its application,

is a remedy peculiarly adapted to domestic practice, particularly among children, before the skilled physician, who should always be sent for immediately when a person it attacked with any acute disease, has time to arrive. Its prompt remedial effects may often be observed in bilious colic, in painter's colic induced by the poisonous influence of lead, in spasmodic croup, in infantile convulsions, in mental excitement bordering on delirium or even violent maniacal frenzy, and in many other diseases, as will be more fully explained in the second part of this book.

HOT BATHS.

Temperature of the Hot Bath.—The hot bath is so designated if the water employed is above the natural blood-heat of about 98 degrees Fahrenheit, and may range as high as 110 degrees, above which it is seldom safe to use water over the whole surface of the body. Of course, habit will often enable a person to endure the local application of water having a much higher temperature than this without injury.

Effect of Hot Baths.—Hot baths are decidedly stimulating, and rapidly produce redness of the skin with quickening of the pulse and respiration. Perspiration is poured out upon the face in great abundance, the mind becomes dull and inattentive, and, if the immersion is unduly prolonged, vertigo and apoplexy may supervene. One experimenter lost, during the short space of eight minutes, in a bath of the temperature of 113 degrees, about a pound and a half of his weight. Even a hot foot-bath of 110 degrees is stated in one case to have quickened the pulse from seventy-seven to ninety-two, and to have caused some headache in about half an hour. In another instance a foot-bath of 113 degrees raised the pulse from sixty to one hundred and five beats per minute in five minutes, and flushed the face, but without bringing on headache.

Where Danger Lies.—The hot bath ought therefore to be employed cautiously or not at all by persons of sanguine temperament, and those of robust or plethoric habit of body, especially if there is any hereditary tendency to apoplexy in their families.

Where Good is Derived.—This powerful remedy is, however, capable of doing good service in conditions of torpid, sluggish circulation, dry and cold skin, feebleness of muscular movement, and a low grade of sensibility; but great care must be used not to mistake this state of the system in an individual naturally weak and phlegmatic, or enfeebled by old age or chronic disease, for the languor of the vital processes which is pro-

duced by acute inflammation, or pressure of the blood upon the brain or upon the lungs.

When to Avoid Hot Baths.—In suspended animation from sunstroke, apoplexy, insensibility from inhaling noxious gases, or from swallowing narcotic poisons, disastrous results might be, and probably would be, produced by the application of a hot bath.

When to Use Hot Baths.—In exhaustion and torpor from exposure to intense cold, the hot bath, contrary to popular opinion on the subject, is a most valuable remedy. Some recent experiments performed in Russia, in order to determine what is the best way to resuscitate animals which have been subjected to such severe cold as to be almost fatal in its effects, gave the following results: Of twenty dogs treated by the customary gradual method of bringing them into a cold room which was slowly warmed, fourteen died; of twenty similar animals introduced at once into a warm room, only eight died; whilst of twenty in an analogous condition, which were placed at once in a hot bath, *all recovered.*

Local Hot Baths.—Hot baths applied locally to small portions of the body only, have often proved beneficial in gout and in acute as well as chronic rheumatism, and are highly recommended by some authorities for the relief of piles, in certain affections of the kidneys, and in some female disorders. Sundry modifications of the hot bath, such as the Turkish bath, the vapor bath, and so forth, have, under certain circumstances, considerable value.

THE HYGIENE OF SEA-BATHING.

When to Refrain from Sea-Bathing.—The long line of seacoast belonging to the United States, and the large proportion of our population which resides within a day's journey of the ocean, by placing a salt bath within the reach of many readers, render the subject of sufficient importance to be separately discussed. On paying a visit to the seaside, it is well to refrain from bathing, and indeed from exposure to the rays of the sun on dry land also, for a day or two if possible after arrival, or until the system becomes a little accustomed to the effect of the salt air and the surroundings. The rules already given in regard to the time of bathing, and especially as to not entering the water for an hour or so before or after a meal, ought to be strictly adhered to.

Duration of Sea-Baths.—The time spent in the water cannot be prescribed with the same exactitude, since the proper length of a dip in the ocean varies very greatly with the temperature of the water and air, the

vigor of the individual's constitution, his temporary condition of health, and so forth. But in the state of the circulation we fortunately have a general guide, which every one can readily consult for himself, and quickly determine when nature decides that the bath should promptly terminate. After the first shuddering inspiration, which is generally produced by the application of cold water to the bare surface of the body, with the quickened pulse and breathing which for a few moments accompany it, the pulse, the action of the heart, and the respiration all become slower for a short time, and then are again accelerated.

Signs to Stop a Sea-Bath.—But if immersion in the cold sea-water is too long continued, the pulse and the breathing are again reduced in frequency, a sense of chilliness comes on, and with this a slight blueness of the lips, and of the fingers underneath the nails, makes its appearance. The moment this is perceived it should be accepted as an imperative order to quit the water at once and restore the lost activity of the circulation, which it indicates, by energetic friction of the surface with warm, dry towels as speedily as possible. As a general rule, from five to fifteen minutes is amply sufficient time to spend in the surf, and it is far better to err on the prudent side by coming out needlessly soon, than to prolong the bath until the teeth begin to chatter and the fingers have the shrivelled, bluish-white appearance of a washerwoman's hand, thereby risking some serious internal congestion afterwards. When the water is unusually cold, and especially when the air is also chilly, a bath in the ocean, if taken at all, should be correspondingly brief.

What Sea-Bathers Should Do.—In order to obtain the best results, a bather should enter the water whilst he is comfortably warm, and yet not in a free state of perspiration. It is a good plan to wet the head and breast first, or after wading only a short distance from the edge, for the purpose of avoiding the temporary fullness of the brain, which leaves some persons with a dull headache for several hours; also, if the sun is shining brightly, a bathing hat, or other protection for the head and nape of the neck, ought always to be worn.

Adjuncts of Sea-Bathing.—Floating, diving and swimming are excellent ways of adding to the pleasure of the sea-bath, but the latter should not be indulged in when the surf is very heavy, when the tide is running out, or when there is a strong current nearly in a line with the margin of the beach, as the latter may diverge a little from the coast, and carry the bather too far out to sea before he is aware of his danger.

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PREVENTIVE MEDICINE

PART III.

PURE AIR NECESSARY FOR HEALTH

THE VITAL NECESSITY OF AIR.

Value of Pure Air.—There are some things in nature of which we take but little cognizance, probably from the fact of their apparent simplicity. Pure air, pure water, pure food are essential and fundamental to good health and health to happiness, so we see that our very lives depend upon the exercise of principles which we neglect to study and understand, possibly on account of other and manifold duties. But nature's laws are invariable, and the time comes when dire results follow a disregard of first principles. Any one will admit that pure, unadulterated food is necessary to health. Food is converted into blood, which having circulated through the body is unfit for further use until purified.

Air a Blood Purifier.—It is through the medium of the air, with its life-giving oxygen, that the blood is purified. It therefore follows, logically, that air and pure air is necessary to health and, other things being equal, the health will be imperfect in proportion to the impurity of the air we breathe. It should be our aim to learn much of so important a condition of health in order that we might, so far as is possible, avoid disease.

Necessity of Pure Air.—Not only is pure air of value to preserve a state of health, it is an absolute necessity. It is true that some persons with strong wills and capacious lungs can perform the feat of holding the breath, but if they endeavor to prolong the experiment from a minute and a half to two minutes the need of breathing becomes so intense that control over the muscles of the chest is lost and a deep inspiration must be drawn in spite of resolutions to the contrary. If the access of fresh air to the lungs is absolutely prevented by external force death speedily takes place, the fatal result occurring in from five to fifteen minutes. This latter condition is present in hanging and drowning and in some forms of croup in children. Four minutes is the limit of time a person can be deprived of oxygen and live.

Fatal Results from Impure Air.—No better illustration of the fatal effects of impure air upon the human system can be brought forward than

the lamentable history of the Black Hole of Calcutta, a prison in India, the horrors of which have rendered it memorable even in that land of ferocious cruelty. According to the account of a survivor, 146 persons were shut up on a sultry night in June in a prison eighteen feet square, furnished with only two small windows, both strongly barred with iron. The thirst and oppression of breathing felt by the unhappy prisoners soon became intense, and the scanty supply of water brought in compliance with their entreaties only made the confusion more terrible, and caused several to be trampled to death. This scene of misery proved entertaining to the brutal guards outside, who supplied them with water that they might have the satisfaction of seeing them fight for it, as they phrased it, and held up lights to the bars in order that they might lose no part of the inhuman diversion.

Frantic Pleas for Air.—Before eleven o'clock most of the gentlemen, who formed about one-third of the whole, were dead, and "air! air!" became the general cry. Renewed insults were devised for the purpose of provoking the guards to shoot them, and every man had eager hopes of meeting the first bullet. About two o'clock in the morning the survivors crowded so much to the windows that many of them died standing, unable to fall on account of the throng. About six in the morning an order came for their release; but at that time, out of the 146 who went into the dungeon ten hours before, only 23 remained alive, and all these miserable survivors were in a highly feverish condition, several dying from putrid or typhus fever soon afterward.

We Breathe Out Poison.—Such, then, are the frightful consequences of overcrowding together a large number of human beings, and thus depriving them of fresh air in such a way that they are exposed to the poisons of their own contamination, comprising carbonic acid and the secretions from the lungs and skin. Wholesale poisonings by very impure air of this kind are fortunately seldom met with, but the gradual injury to health and destruction of life-force, produced by breathing an atmosphere slightly contaminated with noxious ingredients, are exceedingly common, and probably give rise to or aggravate a large part of the diseases to which our flesh is heir.

QUALITIES OF PURE AIR.

Composition.—In speaking of pure air we refer to a standard condition of air. The air is a mechanical mixture of elements. As ordinarily met with at the surface of our earth, pure air, when analyzed, is found to be composed of seventy-nine parts of nitrogen and twenty-one parts of

oxygen to every one hundred parts of air. It contains also a considerable quantity of watery vapor, a trace of ammonia, and from three to six parts in ten thousand of that deleterious gas carbonic acid. Oxygen is the active element. If a candle be held in oxygen it would burn more brightly than in ordinary air, and so our own lives, if lived in an atmosphere of oxygen, would be more quickly spent. Our tissues would be quickly used up. Nitrogen, which forms so large a proportion, acts simply as a diluent; of itself it cannot support life, and a lighted candle held in nitrogen gas is quickly extinguished. Carbonic acid gas, or, as it is called, carbon dioxide, is normal to the extent of .04 per cent., and though it is useless to animals, it is quite as necessary to plant life as is oxygen to us.

Localities of Pure Air.—As air is rendered impure by respiration, the purest air is found in those localities farthest removed from human habitation, *i. e.,* on the mountain tops and upon the ocean. When there is a tendency to disease or during recovery from a disease residence in the mountains or at the seashore is of distinct benefit.

In order to understand how it is that the breathing in and out of the air of a room in time vitiates it, it will be necessary to explain some points of the anatomy and physiology of the respiratory tract—and the act of respiration.

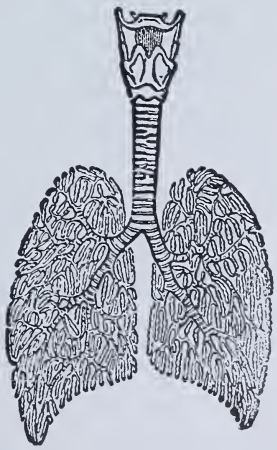
RESPIRATORY TRACT.

Anatomy.—The respiratory tract is made up of the lungs and the air passages leading to them. The air passages comprise the larynx or voice box, the trachea or windpipe and the bronchial tubes—two in number—which are branches of the trachea.

The Larynx.—The larynx is situated at the upper part of the trachea and presents in front the prominence known as Adam's Apple.

The Trachea.—The trachea or windpipe is four and a half inches long, and extends from the larynx to about the middle of the breast-bone or sternum, where it divides into the two bronchial tubes.

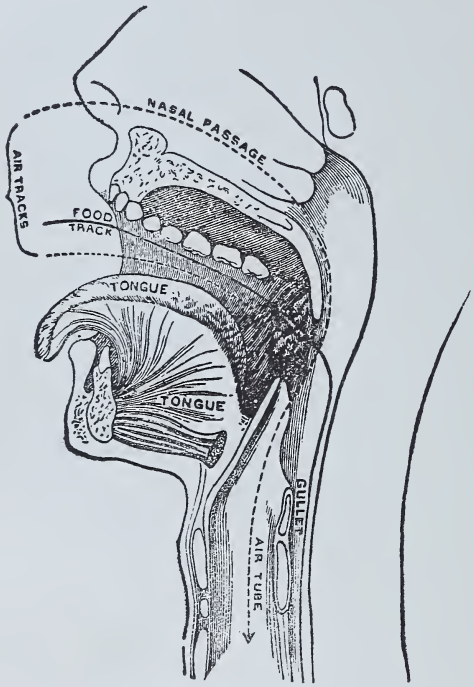
The Lungs.—The lungs, two in number, are situated in the cavity of the thorax or chest, one on either side of the heart. The lungs are made up of lobes, and the lobes are made up of still smaller divisions called lobules or little lobes. These latter are quite small, one one-hundred and twentieth of an inch in diameter, and they



The Lungs.

represent the ultimate divisions of the bronchial tubes, which have ramified and subdivided like the branches of a tree. Surrounding each lung and lining the cavity of the chest is the pleura, an inflammation of which constitutes the disease known as pleurisy.

Physiology.—The larynx, trachea and bronchial tubes admit the air to the lungs. The larynx, in addition to this function, is the organ of voice, being supplied with the vocal cords. Voice is produced by the outgoing air setting these cords into vibration. The air cells, of which the lungs are composed are the meeting places of the air and the blood for the purpose of the exchange of oxygen and carbonic acid.



The Air Passages of the Lungs.

Heart Functions. — The heart, which is a thick, strong muscular bag, pumps the blood through the lungs as it goes round and round through the circulation, at the rate of about sixteen hundred pints of the vital fluid every hour. These sixteen hundred pints of blood, by being spread out in the fine network of delicate tubes in the walls of the air-cells, get rid of nearly sixty pints of carbonic acid, and absorb rather more than sixty pints of oxygen in that length of time. Upon this gaining of fresh oxygen and getting rid of stale carbonic acid unceasingly, our very lives depend, for, as demonstrated in hanging and drowning, if this interchange of the gases in the blood is interrupted for even the space of a few minutes death is the effect.

Unceasing Heart Pumping.—Whilst life continues, night and day, our hearts must go on pumping dark, purple, venous blood into the lungs, to be there purified and changed into red arterial blood by losing its carbonic acid and gaining fresh oxygen, which is carried to every part of our bodies, as has been just explained, conveying everywhere its own new and vigorous life. Night and day, too, quite as unceasingly, must the lungs do

their part, by pumping in fresh air to furnish this requisite supply of revivifying oxygen; and, what is almost equally important, they must pump out the air which has been partly deprived of its oxygen, and has received in its place the worn-out and now deleterious substances got rid of by venous blood. This constitutes the pulmonary circulation in distinction to the circulation of the blood through various parts of the body for purposes of its nutrition which constitutes the systematic circulation.

Respiration.—The lungs, which contain the air, are not active in the act of respiration. The chest cavity enlarges by the contraction of the diaphragm and the elevation of the ribs and sternum, so that the chest is enlarged in its vertical, its transverse and its antero-posterior dimensions. With this enlargement the pressure from without is greater than the pressure from within, and the air rushes in, thereby distending the air vesicles. In expiration the chest-cavity diminishes in the diameters in which it has been increased, and, as a result, the air in the lungs is subjected to pressure, and consequently rushes out. The air that passes in and out with each respiration is called tidal air, and is equal to twenty cubic inches of air. But, after an ordinary inhalation, it is possible, by the exercise of a little effort, to breathe in still more air, to the extent of one hundred cubic inches. This is called the complemental air. After an ordinary expiration it is still possible to breathe out air to the extent of one hundred cubic inches. This is called the supplemental or reserve air.

Residual Air.—After all effort to expel air from the lungs there still remains about one hundred cubic inches, called the residual air, from the fact that it resides in the lungs. But we must not get the idea that this residual air is unchanged, for it is ever being purified.

Frequency of Breathing.—The respirations vary from fourteen to eighteen per minute. They are greater during infancy and childhood. It is then during respiration that the fresh air, laden with oxygen, is carried to the blood to give to the blood its oxygen, and to receive in its place carbonic acid. But the air does not meet the blood directly. On the outer side of the air cells we have the air, while distributed on its inner side we have the small blood-vessels or capillaries which have carried the blood to the lungs. So that separating the air from the blood we have, first, the walls of the air cells, and second, the walls of the capillaries. But these two are so thin and delicate that the exchange can readily take place through them.

IMPURE AIR.

The Impurities of the Air.—The light of modern research has enabled us to know much of atmospheric conditions conducive to disease and health, the latter particularly engaging our attention at this time. The impurities of the air are, first, suspended substances and, second, gaseous substances. The suspended substances are particles of almost every known substance, the most important being sand, dust, soot, pollen, micro-organisms of all kinds, particles of food and clothing. The gaseous impurities are carbonic acid, whenever it exceeds .05 per cent.; carbon monoxide; sulphur dioxide; sulphuric, hydrochloric and nitric acids; hydrogen sulphide, ammonia and its compounds, and organic vapors from decomposing animal and vegetable matters.

Action of Impurities of the Air.—The solid impurities act by clogging up the air vesicles, thereby interfering with their function. They may of themselves be causes of disease, as in the case of micro-organisms. The gaseous impurities act, first, by virtue of their own toxic or poisonous properties and, second, by the fact that they take the place of the necessary element, oxygen. Carbonic acid is normal to the extent of .04 per cent. As before mentioned, air that we inhale contains twenty-one parts of oxygen and seventy-nine parts of nitrogen to every one hundred parts of air. On the other hand, expired air contains sixteen parts of oxygen, five parts of carbonic acid and seventy-nine parts of nitrogen. If, now, we should be placed in a room where the air is unchanged, the air inhaled contains a greater percentage than .04 per cent., and is consequently impure.

Carbonic Acid.—Carbonic acid is the most common impurity of air, and, with its associated organic matters from human or animal breathing, pollutes the atmosphere of closed or badly-ventilated apartments in the manner already described. Acute poisoning from contaminated air, such as took place in the Black Hole of Calcutta, is very uncommon, because people who are long shut up in over-crowded rooms always feel such an overpowering need of fresh air that they can be prevented only by main force from hurrying away from the danger to which they are exposed. Nature warns them so emphatically and imperatively to seek a purer atmosphere that they become ready to sacrifice everything to obey her commands.

Symptoms of Air Poisoning.—The early symptoms of oppression from breathing impure air are too well known to require any lengthened description, although the direct connection of many uncomfortable sensations

experienced in crowded rooms, with the aerial contamination, is not so generally understood and appreciated. Among the primary indications of physical injury to the blood from inhaling vitiated or "second-hand" air, are a disposition to draw long, full breaths, as a result of the stifled or almost suffocated feeling which early makes itself apparent. This is accompanied, or soon followed, by flushing of the face, throbbing of the temples, headache and sickness at the stomach, which may even proceed so far as faintness or an actual fainting-fit, as we often see in delicate ladies accidentally wedged in crowded lecture-rooms, concert-halls or theatres.

Chronic Effects of Air Poisoning.—The chronic effects of long-continued breathing an air which is but moderately polluted are seen in a general deterioration of the strength, appetite and digestion, a pallid dyspeptic appearance, from want of renewal of the blood.

Bacteria in the Air.—Bacteriology has explained the cause of many diseases. The air is everywhere laden with them. They enter our bodies through the respiratory and digestive tracts. If our vitality or resistance is sufficient to withstand their invasion we remain in a state of health; but, when the vitality is lowered for any reason, the bacteria invade the system and disease results. The bacteria present in the atmosphere are not, as a rule, actively disease producing. Those that do produce disease are found particularly where the discharges of diseased animals have been allowed to collect and dry. These excretions become pulverized and are subsequently carried about in the air we breathe. The dried expectoration of cases of tuberculosis, of influenza, and occasionally of pneumonia, produce these diseases in this manner. The boards of health in various parts of the country are fast coming to the conclusion that expectoration upon the sidewalks, in the street cars, in public halls, and so forth, is a menace to the public well-being. In hospitals patients suffering with tuberculous disease are obliged to expectorate in special cups or pasteboard boxes, which are kept covered and subsequently destroyed. Similar measures might be adopted in private practice.

EVIL EFFECTS OF EXPOSURE TO DRAUGHTS.

Cold Air.—Cold air, and especially cold, moist air, is so often a factor in the production of disease that the consideration of this constantly impending danger to health and its hygienic treatment by the means of suitable clothing is very important.

Clothing.—Contrary to the popular notion, clothing gives no heat

in itself, but only saves the heat of our bodies from escaping into the surrounding air, and it does this just in proportion as it is a bad conductor of heat. The rate at which our raiment carries off the bodily heat varies from that of a thin linen coat, for example, which conveys it away rapidly, to that of a thick fur coat, through which the loss of heat into the surrounding air is very gradual. Upon this difference in conducting power for heat the relative value of different articles of dress depends.

Why Clothing Comforts.—Much of the comfort that clothes afford is due to the fact that they give what is called an "artificial surface" to our bodies, on which the cold air can act without our feeling it so much. It is the absence of this artificial surface on the bare hands and face which makes the fingers, forehead and ears ache so with the cold, sometimes in wintry weather, and the reason that people's toes, after a while, often ache in the same way, is that the foot-coverings frequently become chilled through, so that they no longer do their duty as protectors against loss of heat.

Hardening Process.—The process of "hardening oneself" consists in rendering the skin so used to changes from a warm to a cold air, that its blood-vessels and nerves are comparatively little affected by the contracting influence of the cold. "Making oneself tender," on the contrary, is establishing the habit of staying in warm air, and venturing out only when well wrapped up, to such an extent that any accidental exposure to even moderately cold blasts has a powerful, or even dangerous, effect. Hardening the skin against the weather is just like hardening the eyes to a bright light, or the ears to loud noises. All three may occasionally prove valuable accomplishments after they are acquired, but a certain per cent. of the people who try to be thus accomplished will lose their lives, or their eyes, or their ears, in the process. No doubt thousands of young girls have died of consumption caught in the attempt to harden themselves to going with bare arms and bare necks, in the costume absurdly called "full dress" by fashionable society.

Dangers to be Avoided.—In every effort to harden oneself against the influence of changes of the air, and likewise in the practice of that accomplishment after it is acquired, any saving of clothes is often more than compensated for by a waste of extra food used up in maintaining the animal heat, through the process of burning up the fatty and starchy articles of our diet. Besides this, a great and frequently an unnecessary strain is imposed upon the digestive organs, in preparing this extra supply of nutriment, and the nervous system is also severely taxed in regard to both the digestive and the heat-regulating operations, so that study or

other mental efforts may be seriously interfered with. Hence the hardening process should only be applied to our bodies in the most carefully considered way, by people who are, at the time the experiment is tried, in good health, and those especially who are free from any tendency, inherited or otherwise, to disease.

When to Venture Out of Doors.—As a substitute for hardening oneself by exposure to all sorts of atmospheric changes, without carefully regulated protection, attention to the weather indications, or "probabilities," as published every day in the newspapers, has of late years become of great importance from a hygienic point of view. In fact, the study of sanitary meteorology, as this branch of the science might be called, for the purpose of determining what hygienic precautions in regard to clothing, ought to be instituted against hot, moist, or cold air, what days or what hours convalescent patients, and especially children, may venture out of doors, when is the best time for invalids to bear removal, and at what periods neuralgic and rheumatic patients must exercise particular care against exposure, has a highly practical, and sometimes an almost incalculable value.

Providing Against Weather.—Any one, by consulting the daily "indications" in the public prints, can provide against the weather correctly about eight times out of ten, but in order to avoid most of the remaining 20 per cent. of blunders, it is only necessary to combine the knowledge obtained from the signal office predictions with that derived from observations upon an aneroid or mercurial barometer, as described in the following pages.

WEATHER OBSERVATIONS.

Signal Service Bureau.—From the time the great Dr. Johnson uttered his famous sarcasm upon observers of the weather, to wit, "A certain set of men pass their lives in watching the changes of the weather, and die at a good old age with the conviction that the weather is changeable," little has been accomplished in rendering us more truly weather-wise, until the splendid results attained by our own Signal Service bureau gave a new impetus to the study of meteorology.

Value of Weather Observations.—Few can dispute that not only the hygienists of America, but also those of the Old World, are under great obligations to our National Government, which, taking timely advantage of opportunities never before presented in the history of mankind, has utilized them with marvelous success.

Weather Reports.—These opportunities consist, of course, in the cir

cumstances, first, that in our American Union there is a larger compact portion of the earth's surface inhabited by civilized man, now under the same jurisdiction, and controlled by one central authority, than in any antecedent epoch; and second, that by the most extended system of telegraphic communication ever organized, it has been possible, during the last decade, for the first time in the history of the world, to obtain instantaneous and simultaneous weather reports from an area of the earth's surface occupying the whole breadth of our continent, stretching from the thirtieth almost to the fiftieth parallel of latitude, and comprising more than three millions of square miles.

Methods of Observing Weather.—Over this vast section of country signal stations have been established, under the direction of the Weather Bureau, at least wherever practicable, and to such extent as the yearly appropriation would permit. At these stations three observations are taken daily, at the same moment, the hours selected being 7 o'clock A. M., 3 P. M. and 11 P. M., Washington time.

Weather Maps.—By this plan the changes from hour to hour and day to day, as well as the effects which are produced by these alterations, are noted, and after these records are forwarded to the central office, they are reproduced in a permanent form upon the daily weather map, which is transmitted as far as practicable over the country. Here these daily maps may justly be entitled "the geography of our atmosphere." Without examining them, we can no more secure an accurate conception of the general state of the weather than we could gain a correct idea of the real arrangement of seas, continents and islands, as represented upon geographical maps, by walking a few miles along the coast, or climbing over a range of mountains.

Storms.—By means of the extensive series of observations, carried on through several years by the United States Signal Office, it has been discovered that storms occur in areas of low barometer, rounded or oval in form, and two or three hundred miles in diameter, which travel across our country, from west to east, exactly opposite to the apparent movement of the sun in the heavens. The storm therefore is an immense ring or oval of wind, cloud and rain, which speeds across the country about as rapidly as a fast express train; that is, from about 300 to 600 miles in twenty-four hours.

Direction of Storms.—Such storms usually come to us from the Pacific coast, and by having telegraphic messages sent to Washington from several of the western stations on the Pacific Railroad, announcing at what time the storm reached each one respectively, the observers of the signal office

can, of course, tell just how fast that particular tempest is advancing, and calculate when it is due in Washington, exactly as the railroad officials can tell, if they are informed by telegraph, precisely what time their train will arrive from the west. Evidently, after being thus notified, it is an easy matter for the Washington authorities to send word to the people in the neighborhood to get ready to meet the rain in one instance, or their friends at the depot in the other.

Storm Paths.—The path of an area of low barometer across the continent has been aptly compared to the track of an immense water-cart, the centre of which is, as a general rule, the line of most violent storm. The average rate of motion for such a storm-centre is 350 miles a day, although it may vary from 100 to 1200 miles in twenty-four hours. The winds commonly blow from all quarters towards the area of low barometer, the many apparent exceptions being caused by mountain-ranges, valleys, and so forth, turning aside the currents of air.

Barometric Effects.—From this it follows that, when the area of low barometer is running on a line of high latitude, the winds felt in places on its southern margin will be from the south, and *vice versa*. That is to say, if at any time an area of low barometer is passing through New York and New England, the winds in Philadelphia will, in a general way, be towards it and from the south; while, on the contrary, at any time when a similar area is traveling through Virginia and Maryland, the winds in Philadelphia will be from the north, and usually cooler. The exceptions to the rule of north winds being cooler and south winds warmer, are obviously due to large volumes of cold air or of warm air, respectively, having previously been blown to the north or south of a particular position.

Direction of Barometric Areas.—Although the general direction of the areas of low barometer seems to be round the earth towards the rising sun, their course is sometimes very irregular, as is demonstrated by the daily weather maps, which occasionally exhibit them traveling almost due north for three or four days, during which excursion they may pass over a distance of a thousand or fifteen hundred miles, before they resume their usual easterly tendency. The storm, as before remarked, is where the area of low barometer is, and as this almost always approaches us from the west or southwest, most of our storms really come from that direction. Hence there is seldom or never a true northeast storm, much as we hear people talk about "northeasters;" and a northeast wind, with rain, results from an area of low barometer situated southwest of us, and, as a rule, traveling eastward on a parallel of latitude one or two hundred miles south of our position.

Uses of the Barometer.—The use of the barometer is especially seen in determining, by its steady and gradual rise, that the edge of an oval of low barometric pressure has passed over a particular place. It also indicates, by its gradual fall, the oncoming of an area of low barometer, although when, as frequently happens, a storm lags behind this area a little, rain and wind may be most severe with a rising barometer. The indications afforded by barometric observations must therefore be specially studied for each particular place, and judicially combined with the daily report of probabilities from the Weather Bureau, in order to gain the greatest advantage in sanitary meteorology.

INFLUENCE OF WINDS ON HEALTH.

Variety of Influences.—Wind or air in movement exercises upon human health an influence which depends partly upon its rapidity, partly upon the properties which it may have acquired from the land and water over which it has passed, and lastly upon its variations. Its influence from these various causes may be either accidental or temporary, or durable and more profound. Thus, the effect of a cold or damp wind upon an individual who is in a free perspiration, as a consequence of active exercise just engaged in, may be to produce a cold, a sore throat, a bronchitis, or an attack of rheumatism, according to the predisposition or weak point of the person. Hence, as already insisted upon, every man ought to study out carefully his own special aptitudes, under the agency of certain exciting causes, to the development of particular diseases. This is indisputably the part of wisdom, because it is far easier to avoid these exciting causes, which may so readily bring into action the dangerous maladies to which we are predisposed, if we are well informed concerning the exact defect in our armor against their power.

Deleterious Influences.—A wind, if charged with injurious substances, such as the pestilential effluvia of marshes, for example, may carry with it the causes of serious alterations in the health. Some such winds produce, in countries where they blow, diseases terrible both on account of their severity and their persistence, and which cease only with the wind which has brought them. Difference in the rapidity of the movement of the air gives rise to great variations in its effects. A moderate agitation of the air, such, for instance, as a wind moving ten miles per hour, is decidedly favorable to the proper performance of the functions of the skin, to the energetic exercise of the muscular system, and to the maintenance of an agreeable temperature. Nothing, for example, can be

pleasanter, nor in their way more healthful, during the exhausting heats of summer, than the sea breezes of maritime coasts.

Sea Breezes.—When cool air is in rapid motion, however, and just in proportion to that activity, a great and speedy abstraction of heat from the surface of our bodies is perceptible. Air which in repose gave merely the sensation of agreeable freshness, becomes cold when in movement, and cold air under a similar change of circumstances becomes frigid.

Hygienic Effects of Air in Motion.—Physiologists have calculated that, with dry air in rapid motion, the loss of moisture from the surface of the skin is ten times as great as when the air is still and moist. This fact explains the necessity of avoiding, as far as possible, exposure of the body particularly when perspiring to air in rapid motion, because the dangers of chill are thereby greatly increased. On the other hand, a very dry wind rapidly parches the skin, checks its secretions, which are so important to the maintenance of health, and produces a general feeling of discomfort. The exaggerated condition of this prejudicial influence is seen in persons exposed to the celebrated sirocco of the Great Desert of Sahara. The influence of winds depends not only upon their humidity and their rapidity, but also upon the nature of the countries which they traverse. The wind which crosses the icy peaks of snow-clad mountain-ranges carries with it for a long distance the cold with which it is charged. The town of Nice, such a favorite resort for consumptives in the south of Europe, would have an almost perfect climate were it not for the fierce and frigid wind called the *mistral,* which occasionally visits it, blowing from the summits of the Alps down the valley of the Rhone.

Effects of Cold Air.—Cold encountered without forewarning may be the cause of disease. Too often it is a predisposing cause of disease. Cold air may of itself cause disease, as is seen in frost bite, or it may produce its results by simply making the system more vulnerable. To illustrate—it was formerly thought that cold was the cause of pneumonia. We now know that pneumonia, like many other diseases, is due to a germ. Many healthy persons have the germ of pneumonia in the secretions of the mouth. If the vitality or power of resistance is good no evil effects follow. Should the same individual be "run down" for any reason and the added influence of cold be present the germs are no longer resisted and pneumonia results.

Benefits of Winds.—But no cloud is without its silver lining, and if we but look for it, it may be found. If we examine the subject more closely we see that winds are responsible for conditions of health, that upon winds or air in motion depends the whole subject of ventilation to be

discussed later. It is by the motion of the air that respiration is possible. Impure air is diluted by pure air, and then rendered purer.

OZONE.

Among the invisible ingredients of air sometimes found in considerable quantity, but not always present in any appreciable amount, is ozone.

Origin of Ozone.—Ozone is made up of three atoms of oxygen, whereas free oxygen is made of but two atoms. It is therefore concentrated oxygen, and by loss of one of its atoms it is converted into free oxygen of two atoms.

Importance of Ozone.—As yet, the researches of medical chemists only enable us to state that the test of Shoenbein indicates that ozone is more abundant in pure than in impure air; in greater quantity at the seashore than in the interior, and in mountain air than in that of plains; absent in the centre of large towns, yet present in their suburbs; deficient in the air of a hospital ward, yet plentiful in the atmosphere outside.

Ozone in Pine Woods.—Dr. Nicholson, of Michigan, found in a long series of observations that ozone was more abundant in a pine forest than in the open country during the summer, but less abundant during the winter; less abundant in coal-pits and over swamps than in the open country, and less abundant in the night than in the day.

Property of Turpentine.—The results of these investigations in regard to the air of pine woods are in accord with the statements of Dr. Schreiber, of Vienna, who declares that the turpentine exhaled from pine forests possesses to a very high degree the property of converting the oxygen of the air into ozone, and this fact perhaps explains why a continued residence among the balsamic odors of the pines has long been credited with a favorable influence in cases of consumption. The test for the presence of ozone in the air, consisting of paper which has been soaked in starch and iodide of potassium, or iodide of calcium, is not reliable.

VENTILATION.

Importance of Ventilation.—Having reviewed the serious derangements to health that impure air might occasion, it behooves us to consider some preventive measures to ward off disease. The great remedy against impure air is, of course, proper ventilation.

System of Ventilation.—In arranging any system of ventilation, we may assume that the greatest amount of carbonic acid (and its associated organic material from the breath) which may be allowed in an inhabited

room, without injurious results, is six-tenths of a gallon in every 1000 gallons of air, as already mentioned. The first question then is, how much fresh air must be supplied every hour for each person in a room, in order that this proportion of impurity may not be exceeded?

Quantity of Air for a Room.—By experiment and calculation it is found that, in order to keep up this admitted standard of purity, it is requisite that 3000 cubic feet of perfectly pure air should flow into a room hourly for every grown person occupying it. Of course, an equal bulk of more or less vitiated air must escape to give place to the pure air, and this bulk, which must be poured in and likewise emptied out hourly for each individual, would be equal to the contents of an apartment thirty feet long, ten feet wide, and ten feet high.

When Increase of Air is Needed.—Such a quantity, large as it seems, must sometimes be considerably increased, in order to maintain the requisite standard of purity. For example, when lights are used, and no provision is made for carrying away the products of combustion, much additional pure air is needed. An ordinary gas-burner consumes the oxygen of about twenty-five cubic feet of air hourly, and produces nearly as much carbonic acid as ten men would do in the same space of time. Sick people, especially those with diseases of the lungs, and those affected with low or putrid fevers, should have a larger quantity of pure air; and it has been found that, unless 3500 or 4000 cubic feet are supplied hourly for each patient, hospital wards, for instance, are more or less haunted by offensive odors.

Size of Apartments.—The size of apartments for human habitation should be directly dependent, within certain limits, upon the perfection of the ventilating and warming apparatus, because, if the room is small, it is only by securing a proper delivery of warm air that the occupants can receive their allotted 3000 cubic feet per head per hour, without suffering from dangerous or unpleasant draughts. For instance, in a room containing but 100 cubic feet, the air must be changed thirty times hourly, or every two minutes, in order to maintain the atmosphere at its standard purity. This would involve the necessity of such rapid currents of air flowing through the narrow space that it would be almost uninhabitable.

Objection to Small Rooms.—Besides, when the room is small, it is not possible to diffuse equally the air which enters it, because, between the inlet and the outlet, a direct current is apt to be established, so that a good deal of the fresh air passes right through, without being of any use in reducing the amount of impurity.

The Sleeping-Room.—The best authorities assert that, with ordinary means of ventilation, the space for every grown person should be not less than 1000 cubic feet, and that in this space the entire air should be changed three times each hour. According to this rule, a sleeping-room of ten feet wide, ten feet high, and twenty feet long, might be allotted to two people; and four persons, *but no more,* should sit, eat or sleep in a room twenty feet square and ten feet high, provided it was well ventilated in the ordinary way.

Frequency of Air Changes.—If the best ventilating apparatus is employed, and the air is warmed to the temperature of about 65 degrees Fahrenheit, the air in a room may be changed six times hourly without causing annoyance, so that, under such exceptional conditions, an apartment of less than half the size above mentioned, or twelve feet wide, fourteen feet long and ten feet high, would answer for four people.

Death Rate in Small Lodgings.—The dimensions given above are, unfortunately, very much larger than are generally provided in our dwelling-houses, and in the crowded lodgings of the poorer classes the allowance of space for each person often falls as low as 250 or even 200 cubic feet. Under the latter circumstances, the increased sick-rate and death-rate, and the general aspect of what a celebrated French physician graphically describes as "physiological destitution," bear witness to the disastrous effects of breathing impure air in confined apartments.

Natural Ventilation.—A certain amount of natural ventilation, as distinguished from artificial ventilation, effected by contrivances especially arranged for that purpose, goes on all the time through the many crevices, holes and pores of our dwellings, although this supply of air is, as a rule, but a small part of what is necessary for our health. It contributes, however, to the change which does progress, whilst we sit quietly within our four walls without feeling the least draught.

Relative Weight of Airs.—Since air, like other gases, expands or contracts according as it is heated or cooled, warm air is, of course, lighter than cold air, and tends to escape at the upper part of a room, whilst its place is supplied by cold air, which flows in through every aperture in the lower portion. The familiar experiment of opening a door leading to a cold entry an inch or two, and then holding a lighted candle first near the bottom and then at the top of the crack, shows very clearly, by the way the flame is blown inward in the first instance, and outward in the second, how strong are the currents of air in these two positions.

Effects of Second-Hand Air.—Many persons, especially ladies, are so sensitive to the effects of second-hand air in a room, that they can tell

in a very few minutes, by the sensations in the head and lungs, whether an agreeable amount of ventilation has been provided, by leaving the door a little way open, or whether it has been shut tight.

Effects of Differing Temperatures.—The rapidity with which the necessary interchange of air goes on through the crevices of our doors and windows depends very much upon the difference between the inside and outside temperature. This important fact is well illustrated by the following observations of Pettenkofer. He found that, in a room ten feet high, ten feet wide and twenty-six feet long, containing 2600 cubic feet, when the difference in temperature within and without was 34 degrees, the contents of the apartment changed once in an hour, through the ordinary crevices of the doors and windows. In the same room, with the same difference in temperature, but with a roaring hot fire in the stove, the change in the air increased about one-fourth. When, however, in the same room the thermometer stood at 71 degrees, whilst outside it registered 64 degrees, leaving a difference of only 7 degrees, ventilation went on only at the rate of 780 feet per hour, and even opening a window, the aperture of which equalled eight square feet, only increased the ventilation about one-half, or to 1060 cubic feet. This experiment was very instructive, showing, as it does, that a difference in temperature of 34 degrees, with carefully shut doors, windows and crevices, has as great an influence in securing a pure atmosphere as much larger and quite unobstructed communications with the outer air, when this latter is of nearly the same temperature as that inside.

Getting Rid of Foul Air.—The quickest way of getting rid of foul air in a room is by cross ventilation, or "perflation," as it is sometimes called. This is obtained by opening windows on opposite sides of the apartment when a moderate breeze is blowing; but it is a method which cannot be relied upon, because, if the outside air is stagnant, no ventilation is secured; whilst, on the other hand, if there is a strong wind, the violent current of air produced might be unendurable.

SLEEPING APARTMENTS.

Ventilating.—In all rooms which are occupied most of the day, and in all sleeping rooms, proper ventilation should be secured by artificial apparatus specially designed for the purpose, as will be described in the section of this book upon Sanitary Architecture. In old houses, until proper alterations can be made, the exit of foul air ought to be provided for by lowering the windows at the top, and the entrance of fresh air permitted by raising them at the bottom.

Preventing Unwholesome Draughts.—Unwholesome draughts may be prevented in the latter instance by the simple device of fastening a board across the window-frame on the inside, in such a way as to direct the incoming current air upward toward the ceiling of the room. Dr. Keen's arrangement, which is still simpler and equally efficient, is to fasten with tacks or pins a piece of cloth, or even strong paper, across the lower ten or twelve inches of the window-frame, and then raise the lower sash more or less, according to the weather. The convenience of this contrivance is increased if the cloth, instead of being permanently fastened to the window-frame, is held in its place by loops of tape, which allow of its easy removal as occasion requires.

Dangers of Neglected Ventilation.—If we but stop a moment to consider we cannot fail to see the necessity of properly ventilating the sleeping apartments. We are oftentimes surprised at the neglect of these all-important matters by intelligent people. If the air of any room becomes impure during the day we are at liberty to remove to another, and our sense of smell or perhaps a headache indicates when such a change is desirable. But during the night the senses are at rest and the individual must breathe again and again the foul air of an unventilated room.

Consumption and Air.—Speaking on the subject of patients suffering with tuberculosis or consumption under treatment, Tyson states the more nearly the temperature of the sleeping-room approaches that of the outdoors the more likely is the patient to improve. The same truth holds in cases of health.

Remove Plants at Night.—Plants should not be kept in a sleeping apartment. During the night they do not give off oxygen, hence their presence is not needed. It is only under the influence of sunlight that the carbonic acid of the air is changed to carbon, which becomes a part of the plant, and oxygen which supports animal life.

CONTAMINATION OF AIR BY SEWER-GASES.

Dangers from Cess-Pool Germs.—A second great danger of impure air arises from its pollution by emanations from sewers and cess-pools, which frequently contain the germs of typhoid fever, diphtheria and perhaps other complaints, as will be more fully explained under the head of Contagion as a Cause of Disease. Dr. Letheby found that sewage-water excluded from the air and containing 128 grains of organic matter to the gallon, gave off over a cubic inch of foul-smelling gases per hour for a period of nine weeks.

Poisons in Sewer-Gas.—Of course, the danger to persons who inhale sewer-air, or "sewer-gas," as it is often called, depends very much upon whether it is loaded with disease-poisons as well as with foul odors, and the instances adduced by well-meaning but ignorant persons, for the purpose of showing that the emanations from sewers have proved harmless, are chiefly cases in which ill-smelling gases happened to be *unmixed* with the poisons of disease.

Proof of Sewer-Gas Poisons.—It would be just as well to argue that because hundreds of ships cross the Atlantic in safety every year, therefore no shipwrecks ever occur, as to contend that, because many people breathe sewer-gas with impunity, therefore it is never injurious to human health. That some sewer-gas is highly deleterious in its nature is proved by the following stubborn facts; and since we have as yet no tests for determining accurately the degree to which any particular sewer is infected with the germs of disease, our safest plan is to cut off all connection between the air of our houses and that of those dangerous channels for filth and disease-poisons.

Diphtheria from Sewer-Gas.—Dr. William N. Thursfield, of Birmingham, England, reports that he traced an isolated case of diphtheria to temporary exposure to sewer-gas in a house on a short line of sewer which he *knew* to be specifically contaminated by diphtheria. This sewer, when opened and examined by a surveyor, produced in him a severe diphtheric attack.

Typhoid from Sewer-Gas.—Dr. William V. Keating, of Philadelphia, has detailed at length four cases of typhoid fever attributed to sewer-gas from untrapped drain-pipes, and refers to cases of measles, scarlet fever and diphtheria in two other families apparently from the same cause.

Dr. C. W. Chamberlain, of Hartford, relates a remarkable case of fatal erysipelas which was seemingly due to sewer-gas from a waste-pipe carelessly left open beneath the bed of the patient.

Vomiting from Sewer-Gas.—Dr. George Wilson quotes the account of twenty out of twenty-two boys of Clapham, England, who were attacked, and two of them died, with violent vomiting, purging and fever within three hours after standing over a choked-up drain, watching the workmen cleaning it out.

Other Examples of Gas Poisons.—Nor are these isolated instances, for the medical journals of America and Europe record numerous similar

examples of dangerous or fatal effects from disease-poisons in sewer-air when inhaled by human beings.

Avoiding Sewer Poisons.—In view of this great body of evidence, showing the direct conveyance of disease by air from sewers, it behooves us all to avoid the access of such noxious effluvia into our houses, or into any inhabited place whence they can penetrate into the lungs, which are the usual avenue of entrance into human systems.

DUST IN THE AIR AS A CAUSE OF DISEASE.

Solid Particles.—Dust of various kinds floating in the air, and often occurring in such minute particles that it can only be recognized in a bright sunshine, or by the aid of a beam of electric light, as Professor Tyndall has shown, is far more potent a cause of disease than is generally supposed.

Danger of Saliva-Loaded Dust.—Although affections of the stomach and bowels are often induced by the introduction of particles of injurious dust swallowed with the saliva, diseases of the lungs are chiefly to be dreaded when air loaded with substances which are mechanically or chemically noxious find their way to the delicate mucous membrane which lines the recesses of our pulmonary organs. Bronchitis, catarrh and acute or chronic pneumonia, the latter often running on into one form of consumption, are especially to be guarded against in persons who are liable to be forced to inhale dust of various kinds.

Unhealthy Trades.—The effects of dust are chiefly dependent for their severity on the large amount of the offending material, and the angular, rough and hard character of its particles. A large number of the unhealthy trades are insalubrious especially from this cause. Thus, for example, it is stated by Mr. Simon that, excepting in one locality, 300,000 miners break down in England prematurely from bronchitis and pneumonia caused by the atmosphere in which they live. The one exception is most important, because it occurs among the colliers of Durham and Northumberland, where the mines are well ventilated.

Coal Dust and Consumption.—The sharply-angular fragments of coal which may be seen under a microscope to constitute coal dust, mechanically irritate the lungs of those who inhale them, and often give rise to the kind of consumption which is so peculiar that it is called miners' consumption or miners' phthisis. This malady alone cuts short the days of an immense number of laborers among coal dust, and after death their

pulmonary organs are found filled with sharp particles of coal, which being inhaled with the breath, become imbedded in the substance of the lung, and then acting like a vast quantity of tiny splinters in the flesh, give rise to innumerable minute boils or abscesses, by which the breathing apparatus is actually riddled with holes, and so much of it destroyed that the poor sufferers die for want of lung-substance enough to supply properly their blood with air.

Saw Grinders' Consumption.—The fine particles of steel and of sand thrown off in grinding saws and other tools, give rise to saw-grinders' consumption, particularly when dry-grinding is resorted to, and unless the dust is carried away from the workmen.

Particles of Deadly Dust.—In manufacturing these various steel and iron implements, the rough articles are firmly pressed against grindstones, which are revolving sometimes at the rate of three thousand times in a minute. Practically it is found that the degree of danger to the workmen thus employed depends partly upon the amount of dust inhaled, partly upon the character of the particles composing this dust, and partly upon the constrained attitude which the workmen are frequently compelled to assume.

What Dust Most Dangerous.—The grinding of needles and forks is the most dangerous, because it must be done upon dry grindstones, in order to reduce the chance of the fabricated utensil becoming rusty. Scissors, razors and table-knives can be ground partly upon wet grindstones, so that the men employed in such work run less risk of injury from it, whilst the coarser implements generally are now, as a rule, finished upon wet stones entirely, so that still less danger is incurred.

Grinders' Asthma.—The grinders' consumption, called also the grinders' asthma from the difficulty of breathing, which is one of the prominent symptoms, comes on very gradually, and often lasts four or five years before it proves fatal. At first there is only a little dry cough, with scanty expectoration; later on the mucus, which is coughed up, begins to be reddish from a minute quantity of blood mingled with it; and, although there is no fever, and the strength and appetite remain good, an examination of the chest with the stethoscope reveals serious trouble in one or both lungs.

How Recovery is Possible.—Still, recovery is not only possible, but probable, at this stage of the complaint, if the workman can be persuaded to abandon his occupation; but if he persists in exposing himself to the perils incurred by breathing these dangerous dusts into the lungs, the

pulmonary structure soon begins to ulcerate away, and painful, lingering death by consumption follows.

Average Life of Grinders.—Until recent improvements in regard to grinding, the fatality of these particles of dust, when inhaled into the lungs, was very great. According to Dr. Holland, the average age at death of twelve workmen at the trade of needle-grinding was only thirty years and eight months, and other authorities give the duration of life as from thirty-one to thirty-five years.

Use of the Magnetic Plate.—In factories where steel-grinding goes on to a very great extent, the use of a large magnetic plate, for drawing to itself the metallic particles, is very useful; but, of course, it has no power to purify the air from any injurious dust, except that made up of iron or steel, and perhaps on this account it has never been popular among the workmen.

Use of the Mechanical Fan.—Another very efficient method is to draw away the dust in the strong current of air created by a powerful mechanical fan. A single fan may be made to extract the dust from several grinding stones, care being taken to have the opening in the boxes which surround the stones and in which the draught is set up underneath, so as to extract both the heavier and lighter particles. This plan adds materially to the expense of manufacture, and is therefore not very popular among the mill owners, but it so greatly diminishes the dangers to the workmen, when properly adapted, that its employment should be enforced by law, in order to protect the health of the operatives.

Danger from Wet-Grinding.—Although the introduction of wet-grinding for the coarser tools vastly decreases the chance of mechanical injury to the lungs from floating particles in the air, the artisans are often kept covered with the muddy water which is constantly being whirled off from the stones. Being thus exposed to the combined evil influence of cold and wet, they are especially subject to acute bronchitis, pneumonia and rheumatism, which may, however, be in part prevented if the men wear water-proof clothing whilst they are at work.

Pottery Dust.—In the pottery trade there is often a large amount of dust made up of mineral particles, which are very irritating to the lungs of the operatives employed. The same may be said of the artisans who work at the trade of glass-making, the most dangerous department being that of grinding and polishing the cut-glass. Of these men more than one-third are said to die of consumption, and their average age at death is variously estimated at from thirty to forty-two years.

Match-Makers' Diseases.—The makers of matches, who are exposed to the fumes of phosphorus, suffer from a form of ulceration of the jaw-bone, if there happens to be any uncovered portion upon which the poisonous vapor can act, as for instance, around the root of a diseased tooth. The manufacture of many chemical products is exceedingly dangerous to health, and requires special precautions to reduce its evil influence as far as possible.

Danger of Metal Fumes.—In some trades and under certain circumstances the fumes of metals or particles of metallic compounds pass into the air, and render it very injurious to health for those who happen to breathe it. Brass-founders are affected with bronchitis and asthma, as in other trades where dust is inhaled by the workmen, but in addition they suffer from a disease called brass-ague or brass-founders' ague. It appears to be the result of inhaling the metallic fumes, perhaps of the oxide of zinc.

Symptoms of Fume Poison.—The symptoms are tightness and oppression of the chest, with uncomfortable nervous sensations, followed by shivering; unlike those of genuine ague, are not periodical. Coppersmiths are apt to be affected in a similar way by the fumes arising from the partly vaporized metal or from the solder. Tin-plate workers likewise suffer occasionally from the fumes of the soldering.

White-Lead Poison.—Workmen in white-lead manufactories often suffer in the same way from inhalation of fine powder of white lead, chiefly from the beds in which oxidation goes on and in the process of packing the product. And the same may be said of house painters to some extent, although lead poisoning is more apt to occur in them from swallowing the lead compound in consequence of want of cleanliness while taking food.

Tobacco Dust.—Operatives in tobacco factories sometimes suffer from irritation of the throat, nose and eyes by the tobacco dust, and there are some people who cannot become accustomed to an atmosphere of the weed. The greatest irritant effect seems to be produced in the manufacture of snuff, but with the large majority of operatives, if proper care and ventilation is secured, no serious effects result after the first few weeks or months.

Wall-Paper Poisons.—Perhaps the most common kind of poisoning from a metallic dust inhaled with the air is that developed in persons who spend much time in rooms decorated with arsenical wall papers. In some instances, these brilliant yet treacherous decorations, which may be either

green, purple or brown in color, have been found to contain as many as thirty-seven grains of the arsenical compound to the square foot, and numerous well-authenticated cases of serious injury to health from inhalation of the atmosphere of rooms in which this arsenical dust was constantly floating are on record. Whenever a person who occupies a room papered with green or purple hangings begins without any obvious cause to suffer from headache, nausea, inflammation of the eyelids, dry cough, muscular tremors and impaired nervous power, the cause should at once be sought for upon the walls of the apartment, and if the usual chemical tests show the presence of arsenic in a little of the paper which has been scraped off, both the patient and the paper should be promptly removed.

Modern Improvements.—In recent years many improvements have been made in machinery. Factories made sanitary, workmen protected from dangers of all kinds, laws enacted compelling owners of factories to protect workmen; so that at the present time the operator and mechanic does not have the many dangers to contend with he formerly had. In many places illustrated lectures are given, educating him to avoid certain dangers and conditions in connection with his work.

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Foods and Drinks

Part IV of Book III relates to foods and drinks and tells of their hygienic effects upon the different organs of the human body.

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PREVENTIVE MEDICINE

PART IV.

FOODS AND DRINKS

GENERAL CONSIDERATION.

Object of Food.—The object of food is primarily to furnish the means for growth, repair, heat and energy. The mere gratification of appetite, which to the detriment of health too often is regarded with undue prominence, is a secondary consideration and merely incidental to nature's demand for nutrition.

Food, Half of Life's Battle.—It has been said that "food properly chosen, properly cooked and properly eaten is half the battle of life," and the practical value of the subject will readily be understood when it is considered that it plays an important part, not only in maintaining health, but in modifying and curing diseases.

The Problem of Diet.—If all members of the human family were alike it is obvious that a bill of fare could soon be arranged which would give every person the most perfect nourishment; but as we each differ, in some smaller or greater degree, from all others of our fellowmen, it is necessary to study the problem of diet, as modified and limited by our own individual peculiarities and surroundings. Age, sex, occupation, climate, nationality, and so forth, all influence the quantity and the character of food required, and, on the other hand, the amount and nature of food taken govern to no little extent the temperament and characteristics of people.

How Food Affects Races.—It has been pointed out, and doubtless with some truth, that racial distinctions are in a measure the result of the character of the food taken, and that the Irish and the Hindu would not have submitted so supinely to the rule of England had their diet, which consists chiefly of vegetables, been more highly nutritious like that of the British.

How Food is Appropriated.—In considering the subject of food, it is important to understand the method by which it is appropriated by the system and converted into blood, flesh, bone and other tissues, and how it is utilized in the generation of heat and force.

Change of Fluids and Tissues.—During our whole lives the fluids and the solid tissues of our systems are constantly undergoing change. New materials in the form of infinitely minute particles of muscle, nerve, and so forth, are being produced, while the old and worn-out atoms of these structures are removed with ceaseless activity. While this incessant movement of these constituents of our bodies is not perceptible to the eye, even when aided by the most powerful microscopes, it nevertheless goes on, and must go on as long as life continues. In fact, the researches of physiologists tend to show, with a large amount of certainty, that the health, strength and vigor of the whole and of every part of the body is in proportion to its youth and newness. Thus it is that exercise, under due regulation and management, is a hygienic means of such great value in strengthening and developing the whole frame, especially the muscular system.

Relation of Natural Forces.—In endeavoring to reach the "bottom facts" of our knowledge in regard to the forces we derive from the food taken into our stomachs, we must bear in mind that, in our own bodies, as in the whole universe around us, we have, from a scientific point of view, to deal only with material entities of various kinds and properties which we call matter, such as the chemical elements oxygen, carbon or sulphur, and their compounds; and principles of actions, which we denominate forces, among which may be instanced heat, electricity, and the attraction of gravitation, as types.

Natural Forces.—The doctrine of the correlation of forces, abstruse as it sounds at first, is simply, as regards two of them, namely, heat and mechanical motion, an extension of the commonly observed fact that motion, by causing friction, produces heat, as we see in using an ordinary Lucifer or friction match. Every time we strike a match we demonstrate that motion may produce heat; and to expand this idea into the doctrine of correlation (or relationship) of forces, it is only necessary to prove by careful and ingenious experiments, as was first done by Mr. Grove and Mr. Joule, that any certain amount of motion applied in any conceivable way to the production of heat, causes always exactly the same amount of heat, and contrariwise, a particular quantity of heat applied to the production of motion, originates always the same quantity of movement, no matter by what kind of machinery it is applied.

Heat and Motion.—In this way we can, by mechanical experiment, establish the existence of a correlation—or, to use the more familiar word introduced above, a relationship—between heat and mechanical motion, and this relationship has been found to be that the force of a weight of 772 pounds falling one foot would, if converted into heat, raise the temperature of one pound of water one degree of Fahrenheit's thermometer.

Muscular Effort.—After clearly comprehending this idea, it is only necessary to grasp the further suggestion that, if a man is hired to lift up again the weight of 772 pounds, which in falling one foot gave us our unit of heat (namely, the heating of one pound of water, one degree), we further establish, by the additional experiment, a relationship or "correlation" between the number of muscular efforts he is required to make and that same heat unit.

Food Required.—Lastly, if we weigh the extra beefsteak or half-peck of potatoes he needs to eat, to enable him to perform so much extra labor, we find out the equivalent ounces of food for the requisite amount of muscular exertion employed, which is again the equivalent of our (arbitrarily assumed) unit of heat, the quantity of heat which will raise one pound of water one degree.

The Four Natural Forces.—Thus, even those readers who make no pretensions to scientific culture can, it is hoped, understand the nature of that mutual relationship or correlation which exists between these four natural forces, to wit, heat, mechanical motion (of falling or lifted weights), muscular exertion and food.

What Food Is.—Food, then, is any substance which, when taken into the animal body, may enter into such new chemical combinations that it gives out its dormant force in the form of heat, muscular movement, nerve power, and so forth.

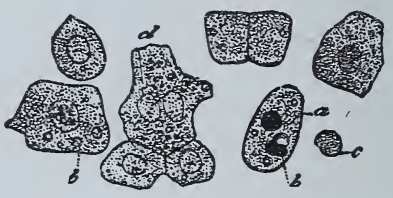
How Food Nourishes.—If an article of food is completely combined with oxygen in the human system, it yields up all the force which it is capable of affording; but if it is not so adapted to the wants of the body as to be fully oxidized or burnt up, part of its force passes off with other refuse matters, and is wasted, as far as that man's nutrition is concerned. It is by learning how to avoid this waste, as well as to escape the injury excess of undigested food is apt to cause to the digestive organs, that a careful study of the articles of diet suitable for each individual, in accordance with the facts and conclusions detailed below, may be made so profitable and beneficial to every one.

STRUCTURE OF ORGANIZED BODIES.

Cell Organization.—All animals and vegetables are built up of minute, separate, organized bodies, called cells, which are put together like stones in a pavement, so as to form the skin, the muscles, the nerves, and so forth. The cell-elements or cell are made up of a nucleus or central living mass, which may be aptly compared to the yolk of an egg.

Protoplasm.—Around this nucleus is gathered a little lump of formed material or protoplasm, corresponding to the white of an egg, and the whole is enclosed in a delicate membrane resembling that which lines the egg-shell. These cells are extremely small, varying from one four-thousandth of an inch to one five-hundredth of an inch in diameter. In the epithelial scales or cells, which are packed together to form the skin, as already mentioned, the average diameter is about one fifteen-hundredth of an inch.

Building of Human Organs.—The different organs of human bodies and those of the inferior animals are built up of cells very similar to those found in the vegetable kingdom, as is illustrated by the adjoining figure. This cut shows the liver-cells of man, with the nucleus, *a*, and oil-drops, *b*, in their protoplasm. At *c* is depicted a free nucleus, that is, one from which the cell-wall and the protoplasm have been accidentally torn away; and at *d* is shown a large cell with two nuclei, illustrating the tendency to occasional twin-formation, which seems to run throughout all animated nature.



Cells of Human Organism.

First Step Toward Human Development.—The first step toward the development of a new being in that wonderful yet hourly miracle of reproduction, as, for instance, of a young chicken inside an egg, is the division of the yolk into a great number of little rounded parts, which soon present the appearance of a heap or mass of cells, which for a time cannot be distinguished from the white cells in the blood of the parent hen. Gradually, however, as the operation of hatching progresses, certain groups of these cells vary under the influence of the vital force from other groups, until, by a continuing process of development, the liver, the heart, the skin, and so forth, are completely formed.

Cell Nourishment.—In chickens, and birds generally, the young creature is nourished until large enough to pick up its own food by the contents

of the egg, but in animals which bring forth their young alive, a curious natural provision is made for supplying the requisite nourishment from the blood of the mother. After birth, however, the necessity for food immediately becomes apparent, and in order that mere existence shall continue, external nourishment of some sort must be regularly supplied. Furthermore, if growth and complete development are to go on, this nourishment must be accurately proportioned in kind, quantity and composition to the exact needs of the infant animal or man.

MIXED DIET REQUIRED BY MAN.

Analysis of cows' milk shows it to contain—

Albumen and casein	54.05
Butter	43.05
Milk Sugar	40.37
Salts	5.48
Water	857.05
Total	1,000.00

While this forms a suitable diet for young children, who, though rapidly growing, expend in labor comparatively little muscular force, it fails to meet the requirements of active adult life.

Kinds of Diet.—Nor, notwithstanding much argument to the contrary, does an exclusively vegetable diet seem best adapted to man's needs. The evidences derivable from the form and arrangement of the teeth, the structure and functions of the alimentary canal, and the results of direct experiment, all indicate that, in the present age of the world at any rate, mankind thrives best, as a general rule, upon a mixed animal and vegetable diet

Amount of Food Required.—The requirements of a full-grown individual may be estimated by accurately determining, as has been done by scientific men, the quantities of the chemical elements carbon, hydrogen, nitrogen and oxygen, which are cast off from the body by the bowels, the kidneys, the skin and the lungs, every twenty-four hours, and then calculating what quantities of various articles of food, containing these chemical elements, must be eaten daily to supply this waste.

What Foods Must Supply.—For instance, if we find, as some English investigators have done, that a gang of one hundred average prisoners cast off every twenty-four hours, from their lungs, kidneys and bowels, about seventy-one and a half pounds of the element carbon, and four

and a quarter pounds of nitrogen, it is obvious that carbon and nitrogen must be supplied to this amount in the food the gang of prisoners eat in order to make up for what is excreted. If they were to be fed upon bread and water alone it would require 380 pounds of the staff of life daily to keep them in good health, because it requires that weight to yield the four and a quarter pounds of nitrogen which they daily cast off in the ways just mentioned. But in 380 pounds of bread there are 128 pounds of carbon, which is about fifty-seven pounds more than would be needed to replace what these men would excrete.

Meat Food.—On the other hand, should the authorities try the experiment of giving them animal food only, it would be necessary to allow them 350 pounds of lean meat, because no less than that amount would contain the seventy-one and a half pounds of carbon necessary to replace the quantity of this element excreted; but lean meat contains proportionately a very large amount of nitrogen, and in 354 pounds of it there would be found 109 pounds, or 105 pounds nearly in excess of what the prisoners really required, and which would therefore be wasted as food.

Mixed Food.—In the former case which we have supposed, each man would have to eat about four pounds of bread, and in the latter about three and a half pounds of meat every day, in order to avoid losing strength. In the first instance, there would be a good deal of starch in the bread, and in the second case, a considerable bulk of nitrogenous material, which would be quite unnecessary as food, and apt if taken into the stomach to overload it and derange its functions.

A True Mixed Diet.—The true way is to resort to a mixed diet, and if such were to be adopted in this instance, we would probably find that 200 pounds of bread, with sixty pounds of meat, would answer every purpose. Two hundred pounds of bread contain, besides water, sixty pounds of carbon and two of nitrogen, and sixty pounds of meat about twelve of carbon and two and a quarter of nitrogen; making, it will be observed, exactly the quantity of each of the primary elements cast off by the 100 men daily as waste matter from the processes of life.

Property of Milk Food.—It is manifest, according to this calculation, that milk is not accurately suited to supporting an adult population, because it contains too little carbon and too much nitrogen to supply the waste. This excess of nitrogen is well suited to the young animal which is actively engaged in adding to its muscular development, but is not adapted to the full-grown man, who is obliged to produce force, or its equivalent, heat, by the slow combustion of carbon in his body. It is to supply this excess of carbon, beyond what exists in milk, that all the world

over, bread or starch, which is rich in carbon in some form, is gradually added in larger and larger proportions to the food of a growing child.

Proper Diet List.—Such calculations, in regard to the other constituents of our food, form a basis of the utmost value for the economical arrangement of diet lists, and the distribution of limited means, as, for example, in armies and navies, with the least possible waste of the ingredients at command.

THE TEETH.

Number and Arrangement.—In the adult human being the teeth, when perfect, are thirty-two in number, and are arranged in the following order: First, in the middle of each jaw, are the four incisors or cutting teeth; next, come one on each side of the group of incisors, the two canine or dog-teeth, so-called because they are very large and conspicuous in a dog's mouth; the next pair of teeth, situated just back of each canine tooth, are named the first and second bicuspids, on account of their having two points or cusps; behind these, again, we find the first, second and third molars or grinding-teeth.

The Molar Teeth.—The last, or third molars, four in number, counting two in each jaw, of course, have received the name of the wisdom-teeth, because they appear about the time that people grow up and are supposed to have arrived at years of discretion.

Children's Teeth.—The permanent teeth are preceded during childhood by a smaller set, only twenty in number, which are styled the deciduous teeth, for the reason that they fall out or are pushed out by the larger and stronger permanent set. These deciduous teeth begin to come through the gums of babies when they are from six to twelve months old, and unfortunately give rise to much of the pain endured in childhood. The adjoining figure shows how the second set of teeth comes in behind the first, or deciduous teeth, pushing these latter out of the jaws from the sixth to the tenth or twelfth year of life.

Structure of Teeth.—Each tooth has, as can be readily seen by cracking open one from a dead animal, a very hard outside shell, composed of what is called the enamel, a softer and thicker body-substance, denominated dentine or ivory, and a hollow place near the centre of this dentine, named the pulp-cavity, which during life is filled with a mass of nerves and blood-vessels. The pulp or nerve of a tooth is exceedingly sensitive, and acutely painful on the slightest touch, or even from mere exposure to the air, as, for example, by the breaking off or decaying away of some portion

of the dentine or tooth-bone which naturally protects it, and which when removed gives rise to toothache.

Care of Teeth.—The prevention of such suffering lies in avoiding the decay as long as possible by keeping the teeth clean, refusing corrosive articles of food or medicine, and, when cavities begin to form, having them stopped up or filled by a skillful dentist before they have time to reach the nerve.

Effect of Hard Brushes.—While frequent cleansing of the teeth is important, it is not advisable to brush them too much with hard tooth-brushes, and especially with gritty tooth-powders, thus irritating the gums and wearing away the very enamel which it is our object to preserve.

What to Avoid.—The teeth should never be used to break hard objects; hot and cold liquids, especially in quick succession, ought not to be brought in contact with them, as in drinking; and strong vinegar, syrups and sweetmeats ought likewise to be kept away from the teeth. If candies are eaten at all, or at rare intervals, the sugar remaining between the teeth and around the gums should be promptly washed away by rinsing the mouth.

THE TONGUE.

Tongue Function.—Besides being the organ of taste and the chief agent in the production of speech, the tongue performs an important duty in bringing different portions of a mouthful of food under the molar teeth during the operation of mastication or chewing. This office of the tongue is shown to be one of great usefulness, by the fact that when paralyzed, either wholly or in part, great difficulty is experienced in chewing food, because it cannot be pushed between the grinding surfaces of the back teeth.

THE SALIVARY GLANDS.

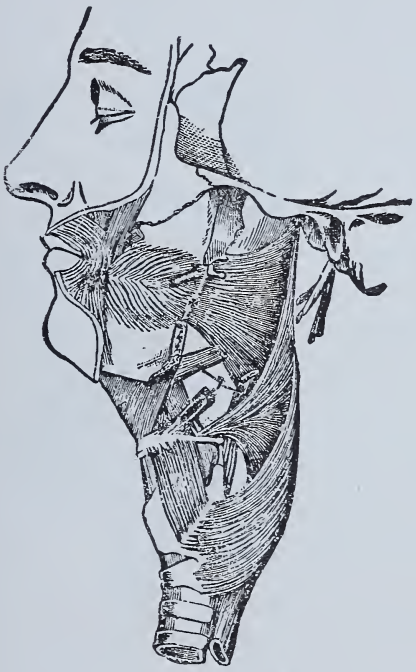
Breaking up the food into a sort of coarse powder is only the first step in its proper preparation for digestion. It must next be mixed with the liquid of the mouth, called saliva, which has the remarkable power of turning the insoluble starch of bread and other starchy foods into soluble sugar.

Number and Location.—The salivary glands, whose business it is to manufacture the saliva, are six in number, four being situated under the tongue and the jaw, and the others seated deeply in the cheeks in front of the ears. These are called the parotid glands, and are remarkable for being the parts affected by the contagious disease named mumps.

Secretion of Saliva.—The saliva is poured out by different ducts, into

various parts of the mouth, so as to become intimately mixed with the food. Its active principle, named ptyalin, plays a very important part in the digestion of the amylaceous substances, that is to say, articles of diet, such as bread, potatoes, corn, and the like, which are chiefly composed of starch.

Thorough Mastication.—It is, therefore, highly necessary that chewing should be performed slowly enough to give time for a sufficient quantity of saliva to be secreted, and to be completely mixed with the food, as want of care in eating too fast is apt to be followed by the disease called dyspepsia, as already mentioned. It is difficult to urge too strongly the importance of a thorough mastication of vegetable food.



The Swallowing Muscles.

Quantity of Saliva.—In the human being, the saliva is produced in the quantity of nearly four pints daily during health; but the secretion of this very important agent in the digestive process is powerfully affected by mental emotions, such as fear, anger or pity, and it is also largely influenced by certain medicines, such as belladonna or deadly nightshade, even in comparatively small doses.

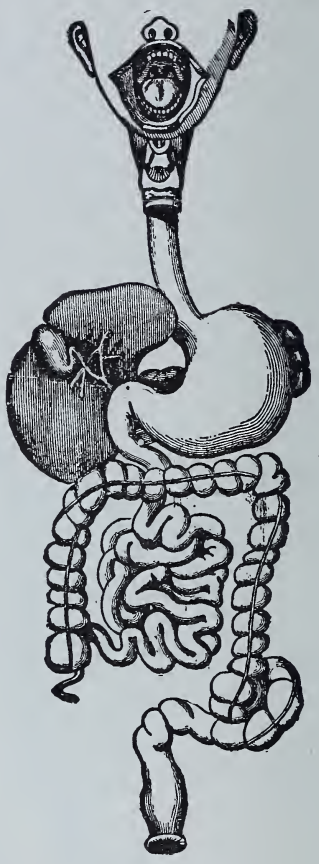
THE ACT OF SWALLOWING.

Operation of the Muscles.—The entire process of swallowing is a series of associated muscular acts, quite independent of the force of gravitation, as may be seen in animals drinking with their heads downwards. Although these complex movements follow each other without any check or pause, it is common to divide them into three stages, the first of which is the voluntary one of pushing the mass of chewed food back to the upper part of the throat or pharynx, so that it is grasped by the involuntary muscles, which send it on downward to the stomach. This operation the muscles which form the tube called the throat or gullet accomplish by relaxing in front of the morsel of food which is being swallowed and contracting behind it. The adjoining figure exhibits the deep

muscles of the cheek and the pharynx with adjoining parts. The circular muscle of the mouth (1) and the buccinator or trumpeter's muscle (2) help the tongue to push the food back to the upper margin of the gullet, where it is seized upon by the three constrictor muscles (3, 4 and 5) of the pharynx, and pushed down the gullet or œsophagus, which is represented as being cut off at 6.

The Glottis.—In front of the pharynx is an opening into the windpipe named the glottis, through which we breathe, but which must, of course, be closed during the operation of swallowing, in order to prevent our food from dropping into it.

The Gullet.—The gullet or œsophagus is a muscular and membranous tube, about nine inches long, which if dissected out would look very much like a thin piece of rubber hose, such as is used for watering gardens. Its duty is to carry the food from the pharynx to the stomach, and in order that it may not get stopped up by food getting wedged in it, this pipe, in consequence of its muscular structure, has the power of contracting itself in successive portions from above downward, so as to push onward the articles of diet which are being swallowed.



The Alimentary Canal.

THE STOMACH.

Shape.—The human stomach is a somewhat egg-shaped bag, the walls, as the substance of the bag is called by anatomists, of which are made up first, counting from the inside outward, of a layer or coat of mucous membrane which is similar to, and continuous with, the moist red mucous membrane which we seen lining the mouth and throat. Outside of this is a coat of muscular fibres, some running around and others diagonally across the sack, and then outside of these again is a layer of membrane or skin.

Stomach Communication.—The stomach communicates, at its upper part on the left side of the body just below the heart, with the gullet, which

opens directly into it, and it empties itself, on the right side, into the upper portion of the small intestine, through a sort of valve, which has received the name of the pyloric orifice, because the word pylorus means a janitor or gate-keeper.

The arrangement of the stomach and other portions of the digestive apparatus, or alimentary canal, or alimentary tract, is well shown in the foregoing figure.

Gastric Juice.—The whole of the mucous membrane, or inner lining of the stomach, is filled with glands, somewhat similar to the salivary glands, but so small that they can scarcely be seen with the naked eye. These glands all open into the cavity of the stomach, and their business is to manufacture, from the blood which flows around them, in a network of fine blood-vessels with very thin walls, that important fluid, the gastric juice, remarkable for having such a wonderful solvent power upon the meat, eggs and other foods which constitute what is called the nitrogenous portion of our diet.

Quantity of Gastric Juice.—The quantity of gastric juice very much exceeds that of the other digestive fluids, being about a gallon and a half every twenty-four hours.

THE LIVER.

This is the largest organ in the body, being situated below the right lung. Its office is the secretion of another digestive fluid known as bile.

Bile.—About one quart of bile is daily produced, it being intimately connected with the digestion of fats. Interference with its proper secretion is largely concerned with the production of constipation and the train of symptoms ordinarily known as biliousness.

THE PANCREAS.

The pancreas is a long, thin gland, situated behind the stomach, and constituting, in the ox, part of what is sold under the name of sweetbread.

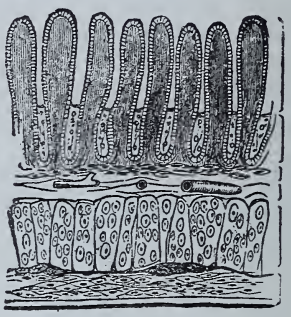
Pancreatic Fluid.—This is secreted daily to the extent of about a pint and a half. It supplements the action of the saliva and the bile by helping to dissolve the starchy materials and to finely subdivide the fatty substances.

THE INTESTINES.

The small intestine is a membranous pipe or tube about twenty feet long, but twisted and looped together in such a way as to occupy only the small space of a few inches in the cavity of the abdomen, which forms the

lower half of a person's trunk, or body, as it is often called, in contradistinction to the limbs and head. This tube is continuous with the pyloric opening of the stomach at its upper end, and at its lower extremity empties into the side of a much wider membranous tube, about five feet in length, called the large intestine.

The Large Intestine.—Most of the large intestine has received the name of the colon, and it may be justly compared to the main sewer of a city, into which pass all the waste refuse and foul materials which are of no further use, and must be gotten rid of as soon as possible.

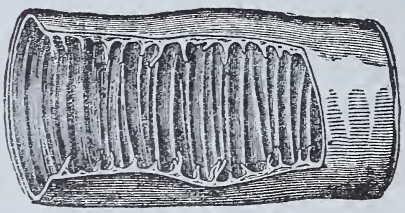


Villi of the Small Intestine.

STRUCTURE OF INTESTINAL CANAL.

Mucous Membrane.—The whole intestinal tube is lined with a mucous membrane, and in the small intestine this has its inner surface covered with hundreds of thousands of little tongue-like projections called villi. These villi are represented as they appear when highly magnified in the marginal illustration, which is a diagram of a thin slice cut lengthwise from the wall of the tube.

Folds of Membrane.—Although the intestinal canal is so prolonged as to measure, when stretched out, over twenty-five feet, its internal surface is not sufficient to perform all the work of absorbing the digested materials of diet. Hence, the lining mucous membrane is thrown into folds, as shown in the appended wood-cut, simply in order, it appears, to afford surface enough for absorbing all the nutriment from the articles of food, and so disposing of the substances we swallow to the best and most economical advantage.



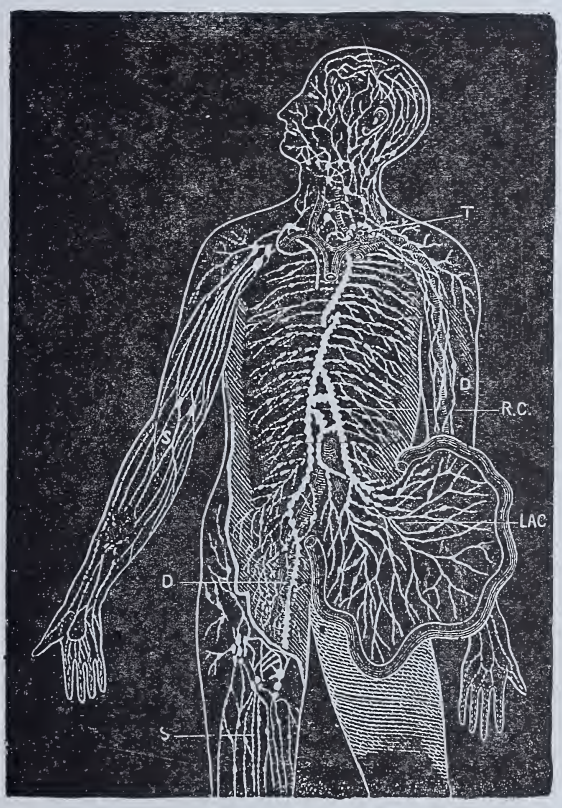
The Valvulæ Conniventes, or Folds of the Intestines.

ABSORPTION AND ASSIMILATION.

In order that the food-stuffs, when altered by the digestive process, may be of any real use to the animal economy, the nutritive materials must be distributed through the different tissues and organs of the body.

Digestion Not Sufficient.—The mere digestion of food is by no means sufficient, and no matter how much we eat, it would accomplish nothing toward keeping our muscles, hearts and brains in active operation, unless food-elements were absorbed after digestion into the blood, and assimilated from it into the very structure of all the different portions and organs of the animal frame.

The Lymphatics.—As shown in the adjoining illustration, the lacteals, LAC., which take their origin in the villi of the small intestine, converge and unite together, meeting the combined lymphatics of the lower extremities in a kind of bag, called the receptacle of the chyle, which is situated deeply in the abdomen and in front of the spine, near its middle. From this the mingled chyle and lymph are carried along the thoracic duct, up to the root of the neck on its left side, where they are poured into the large veins, and so mix with the blood and become a part of that vital fluid.



The Lacteals and Lymphatics.

Distribution of Nutriment.—The nutritious principles of the food having been absorbed by the lacteals and carried onward by the lymphatics to the general circulation are now distributed to the various organs by the blood.

THE CIRCULATION.

Through these channels the blood is kept in constant motion by the action of a muscular pump, the heart, first passing into strong-walled

branching arteries, the walls of which gradually become thinner as the branches grow smaller. These end in a network of delicate capillaries, or hair-like tubes, through which the crimson tide flows slowly into the wider, soft-walled veins, appointed to carry it back to the heart, and thus complete the round of the circulation.

Blood Function.—In its course, it receives the nutritive materials from the stomach and intestines after digestion, the special products of the liver, spleen and the lymphatic glands, and the oxygen absorbed from the air in the lungs. It therefore contains and carries to their destination all the materials required for the chemical and vital changes of the various tissues necessary to life.

Waste Material.—While passing through the capillary networks of the different organs and structures, it takes up the waste materials resulting from the wearing out and decay of these portions, and carries them to the proper point of escape from the body, as, for example, the kidneys or the bowels; at the same time the nutriment needed to rebuild the worn-out organs is allowed to ooze through the delicate vessel-walls of the capillaries, and be diffused into the surrounding tissues.

Capillaries.—In the human being it is difficult to demonstrate the circulation of the blood in the capillaries, but the fineness of their network and the pressure of the blood which is kept up in them to force along the vital fluid may be readily shown by pricking the finger with a needle, the point of which, no matter how small it is, can scarcely fail to penetrate some minute blood-vessel, and let out a tiny drop of crimson blood. This wonderful arrangement can be most conveniently demonstrated in the thin membrane of a frog's foot, stretched out under a microscope magnifying two hundred times.

Circulation in the Web of a Frog's Foot.

Arteries and Veins.—Of the two sets of blood-vessels, the arteries, which convey the blood from the heart to the tips of the fingers and the ends of the toes, carry bright scarlet blood, and are generally deeply seated in the interior of the body and limbs, so as to be, as far

as possible, out of harm's way. The veins, which lie more generally near the surface of the body, as, for example, just beneath the skin on the back of the hand and arm, are filled with dark purple blood, which is much less pure than the arterial fluid, because it contains large amounts of the broken-down materials, the ruins, as it were, of the various bodily organs, which are now on their road to be thrown away out of the system through the lungs, the kidneys and the bowels.

The Heart.—The heart has small chambers at the upper part to receive the blood, and larger, thicker chambers at the lower end, called ventricles, to pump it out. The human heart is also double, having a right side made up of a moderately strong auricle and ventricle, to send the blood to the lungs, and a powerful left side or left heart, with a thicker auricle and a very thick, strong ventricle, to drive blood to all other parts of the body.

The Illustration.—This arrangement of the two independent sides of the heart will be better understood by the aid of the diagram in the margin, which represents the two sides of the heart as separated, as they are in reality in the human breast, although there fastened together and apparently forming but a single organ. The arrows indicate the direction of the blood-current in the entire round of its circulation.

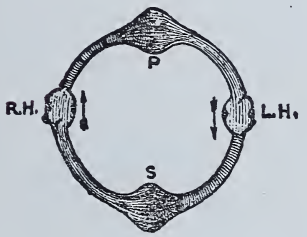


Diagram of the Circulation.

Shape of the Heart.—The human heart is a pear-shaped muscle, about the size of the fist, hollow, like a bag, but with very thick walls. It is divided inside by fleshy and membranous partitions into four parts, very much as a four-roomed house is divided into rooms by its ceiling and partitions, with communicating doors through each of the latter.

The Valves.—The valves consist of a skin or membrane hung across each side of the opening between the chambers of the heart, like curtains, in such a manner that the blood, in running one way, presses them flat against the sides of the hole, and then, as the heart's contraction attempts to drive the vital fluid back again, some of the blood is forced in behind the curtains, and swelling them out so that they meet in the middle, makes them entirely shut off the return-current of the blood.

Pulsations.—The throbbing of the heart may be felt on the left side of the body, near the lower edge of the ribs, and the beating of the pulse, which in health corresponds to the pulsations of the heart, at the wrist and

over the course of large arteries elsewhere, when situated sufficiently near the surface.

Number of Beats.—In adult men these beats usually number about seventy, in women about seventy-five, and in children still more frequent; in infancy being about one hundred and twenty in a minute, and decreasing in frequency with increasing years. Within the limits of health the heart's action may vary considerably, some habitually having a rapid and others a sluggish pulse, when in the same individual such conditions as exercise, emotion, depression or even the process of digestion, may decidedly modify its frequency.

Course of Circulation.—The left side of the heart, marked L. H. in the figure, pumps the blood into the systemic arteries, and thus keeps these vessels over-filled; the larger systemic arteries, A., by their elasticity, exert continuous pressure on the blood with which they are distended; the smallest systemic arteries, A′, by their vital contractility, check and regulate the amount of blood flowing out of the larger arteries into the capillary network, and thus keep up the constant pressure or tension in the larger arteries; the systemic capillaries, marked S. C., are the portions of the vascular system where the great operations of the blood are carried on, that where the worn-out particles from all the tissues of the body are removed and the new atoms for rebuilding these same tissues are supplied; the wide systemic veins, V., are the passive channels conveying the impure blood back to the right side of the heart; the right or pulmonary side of the heart, R. H., pumps the blood into the arteries of the lungs and distends them, though less fully than is the case with the systemic arteries; by the pulmonary arteries, P. A., the blood is carried through the pulmonary arterioles or smallest arteries, P*a*, to the pulmonary capillaries, P. C., where it is exposed to the inbreathed air and exchanges its poisonous carbonic acid for the active life-giving oxygen; the letters L*h* indicate the lymphatics, ending in the thoracic duct, as already described, and receiving in their course the lacteals, L*c*, which absorb the nutriment of the food from the stomach and intestines, designated by I. in the diagram.

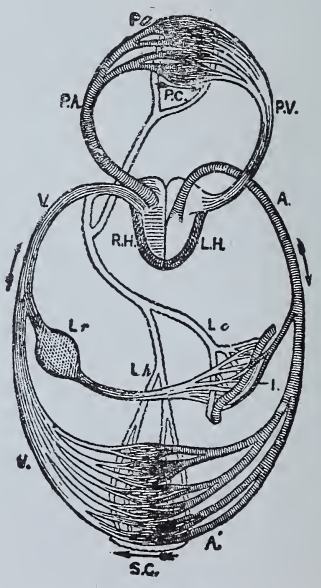


Diagram of Both Circulations.

Description of Blood.—Human blood, when exposed to the air, from which it rapidly absorbs oxygen, is of a bright scarlet color; but when deprived of oxygen it is dark purplish-red. This difference is the great characteristic distinguishing arterial from venous blood, and should always be borne in mind when attempting to staunch the bleeding from a wound, since entirely different treatment is needed in the two cases.

Red Corpuscles.—The blood is not a red fluid, as it appears to be when first shed; it is composed of a watery portion, called the plasma, which has a light yellow color, and an immense number of minute corpuscles, which give to the blood its crimson hue. These little bodies, which are called the red blood corpuscles, are exhibited in different positions in the accompanying cut, as they appear when highly magnified; the illustration also shows two white or colorless corpuscles, one on the extreme left in a rounded condition, and the other at W, misshapen and entangled in some fibrin threads.

Red and White Blood Corpuscles.

CLASSIFICATION OF FOODS.

The foods may be divided into the following classes:

1. Nitrogenous substances, or proteids, which go to form the tissues of the body, and are represented by meat, eggs, the casein of milk, and other substances consisting chiefly of albumen.

2. The fatty or heat-producing aliments, which are derived from both the animal and vegetable kingdoms, although chiefly from the former; they include the animal fats, such as lard or suet, butter and the vegetable oils, among which that from the olive is the one most consumed by civilized man.

3. The carbo-hydrates, of substances containing carbon and hydrogen without nitrogen; these are the saccharine or sugary, and the amylaceous or starchy ingredients of human diet, comprising therefore sugar, molasses, bread, potatoes, beans, etc.

4. The saline or salty articles, consisting largely of common kitchen salt, with potash, lime, magnesia, and a little iron in various combinations. These ingredients of the human body, small as some of them are in amount, possess a very great importance.

Animal Food.—When men are called upon to perform any extra

amount of severe labor, involving great muscular exertion, there is no doubt that an additional supply of meat is of great service.

Fatty Foods.—In regard to the functions of the fatty constituents of food, we may at once conclude that, since the diet resorted to by inhabitants of cold countries invariably contains a large proportion of fatty ingredients, these elements play an important part in the maintenance of animal heat. Indeed, it has been demonstrated by experiment that the respiratory or heat-producing powers of fat are two and a half times greater than are those of the vegetable hydro-carbons, such as starch or sugar.

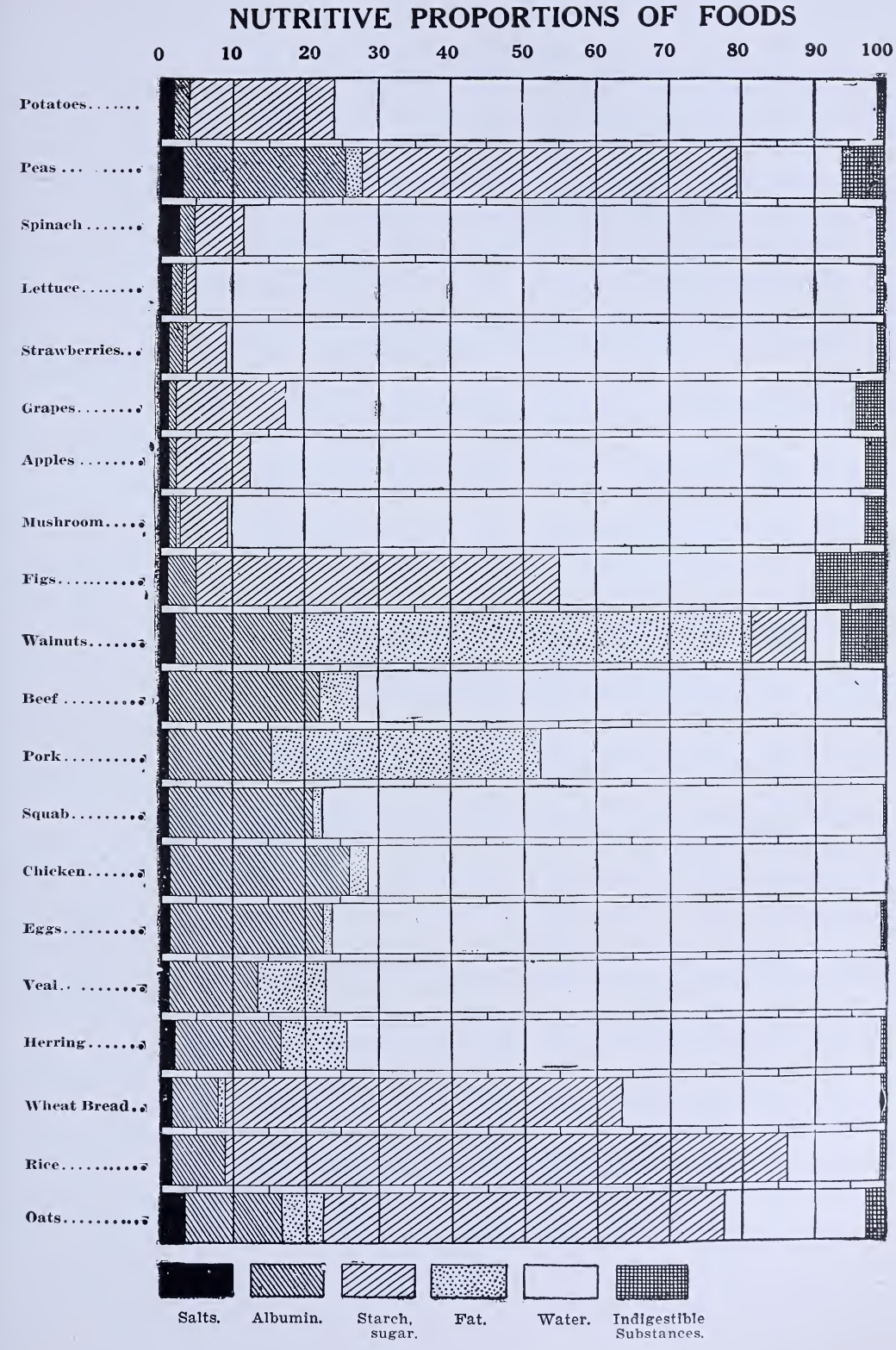
Saccharine and Starchy Foods.—The saccharine and starchy constituents aid the fatty matters in developing animal heat, although they are much less efficacious in this respect. Starch is, however, capable of being rapidly converted into fat by the wonderful operations of nature's laboratory, as we see in the process of fattening pigs upon corn for market, and in this way a large store of the best heat-producing materials may be laid up in the system as a provision for the winter's cold.

PREPARATION OF FOODS.

Soups and Broths.—Where economy of nutriment is an important object to be attained, it is probable that the production of broths and soups, from vegetables and meat in combination, affords many and great advantages. In making nutritious broths with a fair allowance of butcher's meat, it is advisable, when possible, to cook the vegetables separately, and the meat, if intended to be eaten with the soup, should be cut up into small pieces. In any case, the meat should be put into cold water, but should not be boiled, except when the vegetables are cooked in the same utensil, a temperature of about 150 degrees Fahrenheit being quite sufficient. If the meat is plunged into hot or boiling water at the outset, the external layer of albumen is coagulated, and the juices are prevented from exuding.

Boiled Meat.—In boiling meat, on the other hand, when the object is to retain as much as possible of the soluble juices in the meat, the piece ought to be of good size, and it should at once be plunged into boiling water, to coagulate the outside albumen. After being kept boiling for about five minutes, the saucepan should be placed aside, and the temperature allowed to lower gradually; or it may be lowered by the addition of three pints of cold water to each gallon of boiling water.

Boiled Fish.—In boiling fish, the addition of salt makes the flesh


NUTRITIVE PROPORTIONS OF FOODS
0
10
20
30
40
50
60
70
80
90
100
Potatoes
Peas
Spinach
Lettuce
Strawberries
Grapes
Apples
Mushroom
Figs
Walnuts
Beef
Pork
Squab
Chicken
Eggs
Veal
Herring
Wheat Bread
Rice
Oats
Salts.
Albumin.
Starch, sugar.
Fat.
Water.
Indigestible Substances.

firmer and more retentive of the flavor. In cooking green vegetables, they should first be carefully washed in cold water, but not allowed to remain in it, then plunged into boiling water and cooked rapidly. Potatoes should be boiled in their skins, and after boiling for about five minutes most of the water should be poured off, and then the potatoes should be steamed.

Roasted Meat.—In roasting meat, the joint should be placed at first before a brisk, hot fire, with a view, as in boiling, to coagulate the outside albumen, and then the roasting may be conducted more slowly.

Stewed Meat.—Stewing has this advantage over dry-baking—that there is no risk of charring, and the meat is rendered juicy and tender. Tough and strong-flavored meats are, perhaps, best cooked in this way, because they can be rendered very palatable and digestible by the addition of vegetables and seasoning.

Fried Meat.—Frying is even worse than baking, unless very carefully done; but broiling on the gridiron is an excellent way of cooking chops, steaks, kidneys and small dishes of fish or fowl.

RELATIVE DIGESTIBILITY OF FOODS.

Not until 1825 was the question of the relative power of the stomach to digest different foods satisfactorily demonstrated.

Liquids.—Liquid, such as water, both pure and when containing a small amount of nutriment in solution, as is the case with beef-tea or broth, are often quickly absorbed by the lining membrane of the stomach, very much as water is sucked up by a sponge, and pass directly into the blood.

Milk.—Milk is usually coagulated or clotted as we see it when curdled by rennet, which is the dried stomach of the calf, by one of the ferments in the gastric juice, but it is commonly soon dissolved again and absorbed.

Bread.—Wheat-bread composed, as already mentioned, chiefly of starch, cannot be regarded as holding a place among the quickly digestible foods, since it has been found to require nearly three hours and a half for solution.

Eggs.—Eggs, if eaten raw, may be digested in two hours, but if boiled soft may take three hours, and if hard boiled or fried, require three and a half hours for digestion.

Meats.—Meats of various kinds differ a good deal in their digestibility; thus, for example, boiled turkey has been found to disappear from the stomach in about two hours and a quarter; boiled lamb in two and a

half hours, and roast beef in three hours; while fried pork requires over four hours, and roast pork five hours and a quarter for complete digestion.

Fish.—Fish prove, as a rule, more easy to digest than meats; and the ordinary vegetables present less difficulty to the action of the stomach than bread, boiled rice being particularly manageable and requiring only about an hour for its entire solution.

Rules Regarding Meals.—In regard to the periods for eating, experience proves that habit is one of the most important agents in determining the times we ought to partake of nourishment. When a systematic regularity in respect to the period when we introduce food into the stomach is observed, the digestive processes are all better accomplished, and the food is more thoroughly and completely assimilated, than when meals are eaten irregularly.

Time for Meals.—The prevailing custom in this country is to breakfast, soon after rising in the morning, on food nourishing enough to repair the exhaustion consequent upon the long fast of the night, and yet not so heavy as to overload the stomach during the morning, when the most active exertion of the day is usually performed. Whether the most substantial meal be taken at mid-day or in the evening must depend largely upon individual preference, convenience, occupation, and so forth.

Exercise.—A very deliberate walk for half an hour or so in the open air, when the weather is not too cold, accompanied by the stimulus of cheerful, but not exciting nor absorbing, conversation, is a material aid to digestion.

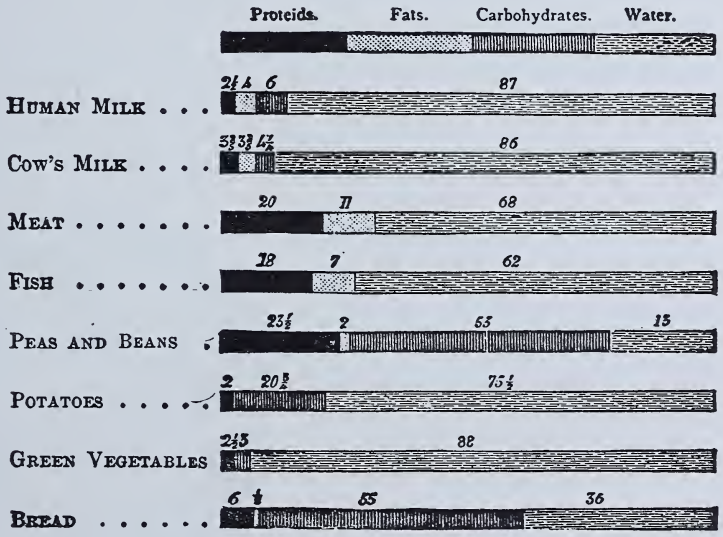
Thorough Mastication.—As already indicated, the thorough mastication of articles of diet, especially by the third set of teeth, is essential to proper digestion, because, during this process of chewing, nature intends not only that the alimentary substances shall be broken up into a coarse powder, but also that this powder shall be completely mixed with the saliva, which has a powerful influence in preparing the starchy ingredients for solution. Hence persons should eat very slowly, chew thoroughly and move the mouthful of food freely about from one cheek to another, in order to amply impregnate it with the fluids of the mouth, and this precaution is particularly valuable when the food happens to be less digestible in quantity or quality than is customary.

The diagram on following page shows the percentage of the different nutritious elements of food in eight of the common articles of diet.

Effects of Overeating.—An English observer has calculated that for every death from starvation, seven occur from the effects of over-

indulgence in food. When the stomach is overloaded with food beyond its power of digestion, nature often relieves the abused organ by the process of vomiting, which no doubt frequently saves people who violate the laws of hygiene in this respect from the penalty of death, or at least of prolonged illness. When, however, the digestive organs are not unloaded in this manner, the ordinary chemical changes, which occur in warm, moist animal and vegetable matter outside of the body, set in, and fermentation or putrefaction occur, large quantities of gas being sometimes produced.

Excess of Nitrogenous Food.—When a superabundance of proteid substances is eaten, and perhaps imperfectly digested, whilst at the same time, as often happens, a diminished quantity of exercise or labor is performed, there must almost necessarily be a disproportion between the oxygen inhaled by the lungs and the nitrogen absorbed from the food, when they



Constituents of Foods.

meet in the blood, and therefore a disturbance of the assimilative processes. It is probable that gouty and perhaps rheumatic affections arise partly in this way, although the direct influence of certain alcoholic drinks in producing gout is indisputable.

Excess of Starchy Food.—Superabundance of starchy articles of diet appears to be less directly hurtful to the system, because a larger proportion of the excess passes off from the bowels in an unchanged condition.

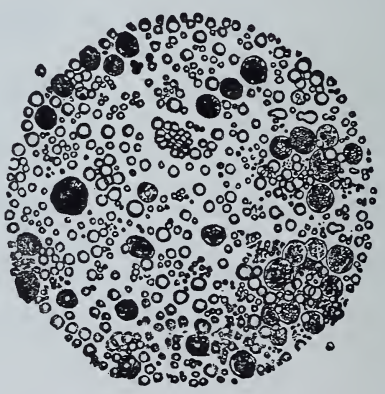
Troublesome corpulence may sometimes result, however, from eating too much starchy food, and it has been supposed that attacks of diabetes, a disease which is characterized by the presence of sugar in the urine, are occasionally due to the same error in diet.

Contaminated Food.—Food is often rendered unwholesome and unfit for use by inherent disease by contamination with poisonous substances and by putrefactive changes. Moreover the peculiar power of absorption possessed by some foods, as milk, pineapples and bananas, is capable of causing the transmission of certain diseases.

Decomposing Food.—Decomposing food may give rise to alarming and fatal poisoning through the absorption of septic materials into the system. It is probable that where chemical analysis fails to reveal a cause for death, many cases giving evidence of violent gastro-intestinal inflammation or of profound impression of the nerve centres, are in reality due to such causes.

Meat of Diseased Animals.—The meat of animals affected with such diseases as pleuro-pneumonia, murrain, anthrax, tuberculosis, Texas cattle fever and parasitic affections, as tape worm and trichiniasis are unfit for food, and precautions should be observed to guard against their employment.

Adulteration of Milk.—The results of the adulteration of milk are mainly those caused by withholding certain nutritious principles from the food supply. Their evil effects are seen particularly in infants fed upon cow's milk, who are thus deprived of much that is necessary to their subsistence and growth. The skimming of milk, or the addition of water, are alike productive of this result.



Human Milk Containing Colostrum Corpuscles.

Transmission of Disease by Milk.—The results of investigation into the causation of numerous epidemics and isolated cases of contagious diseases have shown conclusively that some of these are capable of being conveyed through the agency of milk. By carelessness in cleansing dairy utensils, by feeding cows with contaminated food and watering them from stagnant or infected pools and by exposing the milk to foul and poisonous emanations, milk may become a source of danger to those who take it. Among the diseases which have been often spread in this way are the following: Tuberculosis, typhoid fever, scarlet fever, diphtheria, and so forth.

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Outward Enemies to Health

Part V of Book III deals briefly with many outward enemies to health, such as light, heat, climate, soil, etc.

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PREVENTIVE MEDICINE

PART V.

OUTWARD ENEMIES OF HEALTH

Heat and Disease.—Heat becomes a predisposing cause of disease as soon as the temperature rises above 70 degrees or 80 degrees. When it begins to affect healthy life the pulse, the heart action and respiration are quickened. The skin and lungs are unable to equalize temperature, and the condition of the entire body becomes one of susceptibility to disease.

The Sun's Heat.—Exposure of the body for long periods to the heat of the sun is apt to result in more or less serious disturbances, such as congestions, brain hemorrhages, meningitis, etc. Hence the need of protection against the direct rays of the sun.

Sunstroke.—Sunstroke, or thermic fever, is the result of exposure to heat rays. Its early symptoms are faintness, thirst, great heat and dryness of skin, with prostration. As quickly as possible the body should be subjected to the ice or cold water treatment to neck and head.

Traveling in Hot Climates.—Do not travel during the heat of the day. Protect the person by some covering which will deflect the sun's rays. Rest during the mid-day hours. Content yourself with a scanty, unstimulating diet. Use gently stimulating baths. Wear thin, light, loosely-fitting clothes.

Cold as a Disease Producer.—Cold becomes a disturber of bodily function as soon as it falls to a temperature which ceases to be agreeable. The tissues shrink, the capillaries grow sluggish, perspiration is suppressed, sensibility is impaired.

Sudden Cold.—Sudden falls of temperature are marked by a long train of diseases, or by aggravated or fatal turns to existing diseases. This is particularly true of consumption, catarrh, influenza or grippe and bronchitis.

Cold and Elderly People.—From thirty years on the human body

begins to draw on its surplus power. This power is constantly diminishing as we age. Hence cold affects the aged most seriously by calling largely on a diminishing power. It is difficult to sustain a "blood heat."

Cold and Perspiration.—Cold produces disease by checking perspiration, thus preventing the escape of injurious materials from the blood, and throwing more work on kidneys and lungs, which often become overtaxed.

Cold and the Blood.—Cold tends to drive the blood from the blood-vessels to the surface, thus filling one or more of the circulating organs too full of blood. If any of these vessels be weak the man is handicapped in his battle against disease.

Clothes.—The body loses heat by radiation, by evaporation, by rapid air movement. Hence the necessity for clothing, which cuts off radiation of heat, interferes with the evaporation from the body, and limits the conduction of heat by rapid air movements. Clothing, therefore, plays a most important part in warding off diseases and disease-producing conditions.

Regulation of Clothing.—Garments worn next the skin should be of wool or silk, as best absorbents of perspiration, and as non-conductors of heat. Weights may be light or heavy according to the seasons or different constitutions. White or gray clothes are preferable to black, when one is subjected to direct solar heat.

Poisoned Clothing.—Clothes made of dyed materials are sometimes injurious to health, as containing poisons. This is particularly so of bright colored stockings or underclothing.

Local Injuries.—Cold gives rise to painful local affections, such as frost-bite and chilblains, the former involving the nose, ears and fingers, the latter the feet. Heat applications in any of these cases must be avoided. The cold treatment is best.

Light.—Light has a powerful effect on the system, through both the blood and nerves. It is, therefore, an active agency in the generation of diseases and their cures. It is the essential of all growth, and particularly affects the outer tissues as well as the internal organization.

Light and the Eyes.—Light for the eyes should be carefully graduated, so as to prevent impairment of vision. It has the effect, if profuse, of rendering the eyes sensitive, so that they cannot bear the effects of even subdued daylight without pain.

Colored Light.—Many advantages are claimed for colored light. Blue and green lights are preferable to orange, yellow or red for the eyes.

Certain of the colored lights act beneficially on animal and vegetable growths, and have a great influence in hastening the cures of certain diseases.

Electricity.—Electrical conditions of the atmosphere have a direct effect on the human system. On the approach of a thunder storm, one may frequently notice a difficulty of breathing. Rheumatics are painfully affected, neuralgia is intensified. Many existing maladies are aggravated by electrical conditions.

Electricity in Medicine.—As a medical agent electricity has grown rapidly in favor. As a remedy for many nervous diseases and for pain the galvanic battery has come into quite general use. It is a clean, convenient and safe remedy. It is also economical, for the cost of an electrical machine is within the means of most every one, and it can be self-operated. For the X-ray consult index.

Climate, Soil and Health.—It is not alone in temperature that climates differ from one another, and are endowed with the power to check or engender diseases. Into its influences on the human body must enter all the manifestations of humidity, tempest, fog, dew and wind directions.

Diseases Affected by Climate.—Among the diseases favorably affected by a change of climate are consumption, bronchial affections, diseases of the throat, asthma, chronic gout and rheumatism, dyspepsia, kidney affections, especially Bright's disease, and neuralgia. The advantages of a climate where sea air abounds, or where the air is rarefied and dry, are fully recognized by medical men.

Soils.—These affect health in the most direct manner, and through their mineral, animal and vegetable matter, also their air and water. Diseases connected with moist soils are of almost every type, rheumatism, catarrh and typhoid being most general. Moist soils are favorite breeding places for germs affecting health, and drainage systems should be made as perfect as possible.

Contagion.—The subject of contagion is one of popular notoriety and apprehension. Certain receptive conditions, or a predisposition, the nature of which is as yet unknown, exist in individuals, which appear essential to the development of the specific poisons, and the establishment of the disease. An immunity against the repetition of a malady is generally conferred by one attack of a contagious disease. This safety has been proved real upon an enormous scale in regard to small-pox, and, in relation to the other contagious disorders, a belief in such immunity from second attacks is founded upon very extended observation; but the protec-

tion acquired by a first attack of any of these diseases is of no avail against the rest. Measles, for instance, renders the human body proof, as a rule, against measles, but leaves it as open to small-pox as before, and so on with all the rest.

Morbid Poisons.—With regard to the co-operative effect of fermentation, putrescence or decomposition there is some reason to believe that it may quicken the activity or facilitate the development of specific morbid poisons in the way of a predisposing cause to their reproduction. There is no small amount of circumstantial evidence tending to show that conditions of this kind may be thus favorable to the propagation of specific diseases, even to the extent of rendering them epidemics, in consequence of the predisposing agency of putrefying emanations.

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PREVENTIVE MEDICINE.

PART VI.

THE GERM-THEORY OF DISEASE

Antiquity of the Theory.—In order to make the sanitary precautions thus rendered advisable clearly understood, it should be explained in the first place that the germ-theory of disease, traced by some to the celebrated Pliny, vastly extended by the renowned botanist, Linnæus, more than a century ago, since placed upon a scientific basis, particularly through the labors of the celebrated Pasteur, of Paris, and Professor Koch, of Berlin, to whom more than to all of their co-laborers in this important field belongs the honor of proving what had long been suspected, the relation of micro-organisms to disease, and removing this subject from one of theory to one of incontestable fact.

The Pasteur Controversy.—Without relating in detail the controversy that Pasteur's announcement made in 1857 that fermentation and putrefaction were brought about by specific ferments and that these were composed of living cells, it is sufficient to state that this assertion led the way for further investigation, discovery and proof, with the result that the micro-organisms causing the diseases of relapsing fever, discovered by Obermeier; that of typhoid fever, by Eberth; of diphtheria, by Loeffler; of cholera and tuberculosis, by Koch; of pneumonia, by Friedlander and Frankel, and the origin of many other diseases are now known as the result of the labors of other investigators, whose claims were subjected to the test of the laws formulated by Koch before their character was established as proven.

Germ Laws.—In substance these laws insist (*a*), "that in order to the acceptance that a specific micro-organism is productive of disease, it must be demonstrated. (*b*) That it is constantly present in the fluids or tissues of the individual subject to that disease. (*c*) Its absence from all other diseases. (*d*) Its isolation, growth and repeated cultivation on proper culture media. (*e*) Its power of reproducing the disease after inoculation in susceptible animals."

BACTERIA (See Adjoining Plate).

Bacteria (Greek, stick).—Bacteria are the diminutive organisms commonly called Microbes (Greek, little). They are visible only under a microscope of high magnifying power.

Forms.—There are three recognized forms of bacteria.

Spiralus.—1. The spiral, or wriggling, form, the only form capable of progressive motion.

Bacillus.—2. The stick-like, or straight rod-like form, incapable of motion.

Coccus (berry).—3. Very like, when magnified, a period in print; incapable of motion.

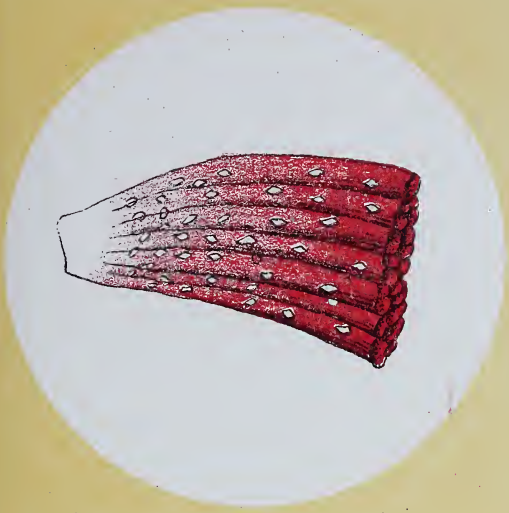
The Plate.—Upper left-hand object. The circle shows the size of the little drop of liquid subjected to the microscope. It is called the microscopic field. Within, in red, is a magnified section of human muscle. In its folds are seen, in white, the encysted spirala, called trichinæ (hairs). They are found in diseased pork, and enter man through the eating of raw or under-cooked pork. Thorough cooking kills them.

The Plate.—Upper right-hand object. This is the trichina magnified and more mature. It has taken on the spiral form, due to growth, and is consuming the muscle in which it is embedded.

The Plate.—Lower left-hand object. This shows (1) in white, four cells scraped off the intestines, in which cholera germs may lodge. The little dark objects are the spirala of cholera. They are found in the intestinal canal and feces of cholera patients.

Form.—They are short, comma-like elements, also in the form of U and S, and again long and spiral. They are capable of motion. They are cultivated in gelatin, agar-agar, blood serum, potto and bouillon.

The Plate.—Lower right-hand object. This shows the bacillus of consumption (tuberculosis). It is rod-like in shape, slightly curved, and rounded at both ends. It is not mobile. It may be cultivated in blood serum, glycerine and agar-agar.



Encysted Trichina in Human Muscle
Double natural size.

Trichina in Human Muscle
Highly magnified.

The Cholera Germ and four Intestinal Cells
(Comma Bacillus)
Magnified to 400 Diameters.

The Fungoid Growth causing Consumption
(Bacillus Tuberculosis)
Magnified to 800 Diameters.

Results of Germs in the Body.—The results of the introduction of living organisms into the system are local or general; the local disturbances are of an inflammatory nature caused by mechanical irritations arising from the presence or activities of the organisms and are accompanied by proliferation of cells and the formation of new tissue.

General Disturbances.—The general disturbances may possibly result from (*a*) nutritive derangement; or (*b*) the organisms may cause innumerable foci of local inflammation, producing general disturbance, as for example in tuberculosis; or (*c*) by their activities of growth, reproduction, nutrition, etc., they may give rise to poisonous materials (ptomaines, toxalbumins, etc.), which act on the system as any general poison, malaria is probably an example of this class.

Period of Germ Ripening.—The period of incubation is the time between the introduction of the specific organism of a disease (exposure to small-pox for example), and the manifestation of its symptoms.

Increase of Symptoms.—The gradual increment of the symptoms is attributed to the progressive growth of the millions of minute fungoid plants, whose period of greatest luxuriance marks the acme of the attack, and the death and destruction of which correspond to the decline of the disease. The contagiousnes of the communicable maladies is accounted for very beautifully by the existence of the immense number of bacteria forming the true seeds of disease, constantly produced, evolved from the affected individual, and carried through the air of a room or house either alone or attached to some of the innumerable epithelial cells, which are being rubbed off by millions from the surface of human bodies.

Absence of Second Attacks.—The general absence of second attacks is admirably explained by the hypothesis that the parasitic fungus on the first occasion has exhausted all, or nearly all, of some peculiar (unknown) organic ingredient in the body, which is absolutely requisite for its support, according to the very same law that will cause, as every farmer knows, his wheat to fail if he plants it repeatedly in the same ground and neglects to secure a due rotation of crops.

Transmission of Disease.—Hence, according to this doctrine, contagious diseases are conveyed from one person to another by the transplanting of miscroscopically visible organisms and spores or seeds which have a separate vitality of their own, each after its kind, and which are to be escaped just as one would escape hordes of animal or swarms of insect pests by shutting them out or killing them before they can succeed in fastening upon human bodies.

The Itch Germ.—It is curious how we have seen in regard to small-

pox and diphtheria, etc., the same old battle fought which fifty years ago was so strenuously contested by Biett and Morgagni on the one hand, and the microscopists on the other, in relation to scabies or the itch, now universally admitted to be caused by a tiny insect which burrows beneath the human skin.

Size of Disease Germs.—As having an important bearing upon the hygienic precautions instituted, great benefit would probably result from its being understood by every man, woman and child that the contagion of small-pox, scarlet fever, typhoid fever, yellow fever, measles, diphtheria, cholera, and so on, is composed of exceedingly minute forms of life, so small that 25,000 of them, placed end to end, would measure less than one inch in length.

Multiplication of Germs.—Bacteria under favorable circumstances multiply with inconceivable rapidity, reproduction occurring most frequently by cell division; this is technically known as fission, constriction taking place in the centre of the cell, with ultimate separation at this point into two separate living beings; from one parent organism, maturity occurring in one hour, a progeny of fifteen millions is theoretically possible in twenty-four hours.

Nature's Law.—It is, however, probable that the same law of the prodigality of nature, exemplified in the spawn of the herring and salmon, holds good, and not more than one spore in a thousand, a million, or a hundred millions, perhaps, has an opportunity to reproduce its species.

Care Required.—As there is no doubt that the contagion of the diseases just enumerated may penetrate into your system by the air that is breathed, the food that is eaten, and especially the water that is drunk, it is obvious that only the most scrupulous care can save us from these extremely minute seeds, or insure their destruction after entrance into our bodies is accomplished. If these germs were singly disseminated, it would be almost impossible to avert constant infection; but as they generally are carried about by winds or currents in aggregations of thousands or tens of thousands, of course the chances of imprisoning them, or otherwise shielding ourselves from them, are largely increased.

Sanitary Regulations.—The obvious deductions from these facts tend to strengthen the urgent recommendations of sanitarians, that every effort should be made, first to prevent these morbific germs from being let loose upon the world; and second, when they have made their escape into the free air or water, to destroy all these forms of life that are likely to come in contact with unprotected persons—that is to say, human

beings from whose bodies one crop of small-pox (or cow pox) fungus, yellow-fever bacteria, relapsing-fever spirala, and so forth, has not already been raised. Each individual affected with small-pox, scarlet fever, diphtheria, or any other of the diseases above mentioned, is, according to this theory, to be looked upon as a sort of hot-bed or forcing-house for the seeds or spores of that malady.

Germs Grow Like Weeds.—Now, these germs, just like the seeds of larger noxious weeds, which, when allowed to gain a foothold in fields and gardens propagate themselves with such immense rapidity, yet with few exceptions, have no power to move of their own accord, and can only develop if they meet with air, moisture, and congenial soil suited to their peculiar requirements—that is, if a small-pox patient is shut up in an air-tight room, so that the seeds cannot escape; or if, whilst in the open air, that air is stagnant, so that no seeds are wafted away from the immediate neighborhood of the individual; or if, when carried along by the wind, they are blown away from any human habitations, or are desiccated in a dry atmosphere, baked by the sun's rays or artificial heat, frozen by extreme cold (as seems to be the case with yellow-fever germs); or, finally, if they happen to meet with no persons but those who have had small-pox or been sufficiently vaccinated; in other words, if they do not "fall upon good ground," all this wealth of provision by which nature tries so hard to secure the perpetuation of the poisonous plant causing small-pox in our systems, becomes unavailing, and her malevolent design against our race, carried out with such a prodigality of murderous weapons, utterly fails.

Avoidance of Germs.—The germ-theory of disease teaches that every new case of the contagious maladies is the immediate offspring of a preceding case, and the direct result of exposure of an unprotected human being to the chance of having the spores or seeds of disease implanted in its system, an exposure which it only requires sufficient knowledge, sufficient foresight, and sufficient care to avoid.

PART VII OF BOOK III

Treats of the manner in which a house should be constructed to be thoroughly sanitary and shows the advantages derived from this method of construction.

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PREVENTIVE MEDICINE.

PART VII.

HEALTHY DWELLING HOUSES

A healthy dwelling house is a very potent factor in the prevention of disease. If the house or its surroundings be unsanitary its inmates are subject to disease in many ways that would not otherwise occur, and therefore it is important that the sanitary or unsanitary condition of his abode should be considered by every householder.

SITE, CONSTRUCTION AND INTERNAL DECORATION.

Conditions of a Healthy Home.—The conditions necessary to insure a healthy habitation may be summarized as follows:

1. A site dry and not malarious, and an aspect which gives light and cheerfulness.

2. A ventilation that carries off all respiratory impurities.

3. A system of immediate and perfect sewage removal which shall render it impossible that the air shall be contaminated from excreta.

4. A pure supply and proper removal of water, by means of which perfect cleanliness of all parts of the house can be insured.

5. A construction of the house which shall insure perfect dryness of the foundations, walls and roof.

Choosing a Site.—The site for a dwelling is rarely selected from a consideration of the healthiness of the location, particularly in its relation to the conditions of the soil. Other considerations, often of an accidental character, more frequently determine the choice. And yet there is no more important subject to be taken into account in planning a house, none which demands a closer scrutiny, in view of its influence upon the

health of the occupants, than the character of the soil in which its foundations are laid.

Effect of Soil on Health.—It is only within recent years that public attention has been generally directed to the important relationship existing between certain physical characteristics of the soil and health. The ground-air, ground-water and dampness have all been studied in connection with their agency in the production of certain diseases of common occurrence, and important facts have been arrived at, which are of great advantage in instituting measures for the preservation of health.

Diseases Due to Damp Soils.—Paroxysmal fevers, typhoid fever, bilious remittent fever, dysentery, diphtheria and cholera (during epidemics of that disease) have all been attributed to earth effluvia. It is a well-known fact that dampness of the soil will cause catarrhal affections, rheumatism and neuralgia.

Consumption and Damp Soils.—It has been clearly shown that dampness of the soil under houses is one of the chief factors in the production of consumption—that plague of our climate which destroys more lives than any other disease. Typhoid fever has also been supposed to be connected with changes in the water in the soil. A similar view is held with regard to dysentery, bilious remittent fevers and cholera. It is thus seen how potent are the influences of certain conditions of the soil in undermining health, and in causing disease, and therefore how important it is to use every means for protecting ourselves against these enemies of health.

The Air in the Soil.—All soils and most rock formations are more or less porous, and are capable of holding in their pores and spaces air or water, or both. When air as well as water is present, the soil is said to be moist. Only the hardest rocks are free from air. Gravel and loose sands are well known to be very porous, the latter containing often as much as half their bulk of air. The amount of air in some varieties of soft sandstones sometimes reaches 40 per cent.

Composition of Soil Air.—The composition of the air in the soil is variable, and differs widely from that of the free atmosphere. Carbonic acid in variable quantity is usually one of its constituents. The origin of this gas is supposed to be due to organic changes taking place in the soil itself. It cannot be derived from water precipitated from the atmosphere, as the amount of this gas in meteoric water is exceedingly small. Nor is it to be sought for in the ground-water as a source; but is most likely derived from the soil, and is imparted to the ground-water and

ground-air simultaneously, but more freely to the latter on account of its greater absorbent capacity.

Sources of Polluted Ground-Air.—The ground-air contains more or less moisture, and is liable to be contaminated by effluvia and organic matter arising from the constituents of the soil. A frequent source of ground-air pollution in inhabited places is the impurities which soak into the soil from leaking cesspools and drains, from badly-constructed sewers, from leaky gas-mains, and from deposits of filth upon the surface of the ground.

Motion of Soil Air.—It is important to observe that the air in the soil is in continual movement. This movement is especially active in dry, porous soils. The motion of the air in the ground is caused by pressure of the atmosphere and wind against its surface; by changes in the temperature of the lower strata of the atmosphere and of the upper surface of the soil, by the rainfall, and by changes in the level of the ground-water; and to some extent by the operation of the law of diffusion of gases.

Closing of Ground-Pores.—At every rainfall, the pores of the superficial layers of the ground are closed by the inflowing water, so that the upward escape of the imprisoned air is hindered, while the rise in the ground-water exerts a pressure from the opposite direction; under the circumstances the ground-air seeks an outlet at the point of least resistance, and in many cases escapes into dwellings—the more freely, the more extended and copious the rainfall.

Currents in Ground-Air.—A current in the ground-air may be caused by local conditions; thus, a house artificially heated, being warmer inside than the external air, will cause a current of air to enter it from the ground on which it stands. Any impurities in the surrounding soil may find access to the house through this channel.

Coal-Gas in Dwellings.—Numerous instances have been recorded of the penetration of coal-gas into dwellings through the pores of the soil under the basement floors, the entrance of the gas being facilitated by the activity in the current of ground-air caused by the heated house. Ill-health, and even death, has been caused by gas escaping into houses in this manner. In the same way the air made noxious by the oozings from cesspools and broken drains, and by foul matters contained in the soil, may gain entrance through the foundation floors.

FEATURES OF A HEALTHY SITE.

A Clean, Natural Soil.—A clean, natural soil, such as is free as possible from those organic changes or processes which cause unhealthy emanations, should be the prime object in changing the location of a dwelling. No effort should be spared in improving the healthiness of a site. This may be accomplished by keeping the soil clean through efficient drainage, abolition of cesspools and other sources of filth-impregnation, and an abundant source of water for maintaining cleanliness in all parts of the house. And further, by making the ground floors and walls, as far as possible, impermeable to air.

Dangers of Made-Ground.—"Made-ground" is to be looked upon with the greatest suspicion. Such a soil, generally composed of the refuse of a town, is necessarily very impure, and a house built upon it is liable to be unhealthy. A process of purification by oxidization and the influence of rain naturally takes place in the course of time, but the uncertainty of the result should always be determined by an examination of the ground. It is, however, best to avoid such a location altogether.

Of Porous Soils.—Porous soils, such as those composed of gravel or rubble, are generally supposed to be healthy, but the assumption is not to be taken without qualification. The great facility which they afford for the circulation of air, and, through this medium, of conducting impurities for a long distance, aided by the suction power of the house, makes it essential that such soils, in order to be healthy, should be free from noxious effluvia and deposits of animal or vegetable matter.

Danger of Porous Soils.—Dry, porous soils, otherwise unobjectionable, may be the source of morbid exhalations. The ground in inhabited places, and even about isolated dwellings, often becomes impregnated with filth from sewers, broken drains, cesspools, and refuse heaps, which undergoes decomposition and gives rise to noxious gases which are dangerous to health in proportion to the degree of concentration.

Ferments in Soil.—Such a filth-sodden soil is, moreover, a convenient *nidus* for the production of those morbific ferments which seem to be connected with certain palpable organisms, which are looked upon as very important agents in the production of some of the common diseases that afflict humanity.

Diseases from Soil Emanations.—Among the diseases which have been attributed to emanations from the soil may be mentioned typhoid fever—

that scourge of the country as well as the city—cholera, fevers, dysentery and diphtheria.

To Prevent Soil Emanations.—As it is impossible to prevent the circulation of the air in the ground, structural devices must be employed to keep the soil-exhalations from rising up into the house. This is best accomplished by covering the entire site of the house with a layer of cement, concrete, asphalt or some other impervious material. A layer of concrete at least six inches deep, well rammed and well grouted with liquid cement, and made smooth upon the surface, makes a most satisfactory barrier to the ground-air and dampness.

PREVENTION OF SOIL EXHALATIONS.

Ground Air.—Every house should be protected from access of ground air. The selection of a proper site has much to do with this, but not all, for since it is impossible to prevent the circulation of ground air, certain devices must be employed to keep soil exhalations from rising into the house.

The Best Device.—The best device for this is to cover the entire site with a layer of cement, concrete, asphalt or some impervious material. A layer of concrete six inches deep, well rammed and grouted with liquid cement, is a most satisfactory barrier to ground air and dampness. Asphalt over concrete also affords an excellent barrier. Such a floor has the advantage of being free from cracks and holes which harbor vermin.

Dampness of Soil Injurious.—Dampness of soil is dangerous to health. A dry, porous soil with possibilities of natural drainage will be found to be salubrious. Elevation of site is an indication of the presence of this condition. A damp condition of soil may be kept up by injudicious planting of trees and shrubs too near the house or by neglect in diverting drainage to some distant outlet and thereby preventing its absorption by the soil.

House Aspect.—In choosing a house site preference should always be given to the aspect or exposure which gives most light and cheerfulness, insures free circulation of air without being subjected to violent gusts of weather and is defended as far as possible from North and East winds; a location free from mists and fogs, sudden shiftings of temperature and malarial and other injurious influences.

Removing Soil Dampness.—For a building to be healthy the subsoil water should never be allowed to rise to the level of the foundations. To

prevent this ordinary land drainage pipes should be so laid as to carry off the subsoil waters into some sewer or other outlet.

Foundations.—Foundation walls should be composed of the best materials and to prevent moisture being absorbed by the materials, thereby injuring the walls and timbers and rendering the atmosphere within unhealthy, a damp-proof course of some impervious substance like cement should be built in the wall just above the surface of the ground.

External Walls.—The walls of a house are sometimes rendered damp by exposure to continued wet weather. Various means have been employed for protecting the outside walls in exposed positions. Smooth, hard bricks, glazed bricks, slate, cement, weatherboards and tin have all been satisfactorily used for this purpose and under a variety of circumstances. Some walls are improved by a coating of good paint, but its frequent renewal makes it expensive. Hollow walls are not infrequently constructed as a protection against dampness. Two parallel walls are constructed with a space between them three or four inches wide and joined together with bonding-ties of iron or stoneware. By this plan not only is dampness excluded but a more equable temperature is maintained in the house.

Construction of External Walls.—Whatever be the material chosen for the external walls it should be of the best quality and well put together. If stone or brick be chosen, and the latter is always preferable as being fire-proof, the laying should be done in well-tempered mortar or cement, and the wall should be of sufficient thickness to insure stability, keep out weather and protect the air of the house from the influence of sudden weather changes.

Chimneys.—To insure safety against fires the brick work of chimneys and fire-places should be at least nine inches thick, and no wooden plugs or bricks should ever be inserted in it lest they become charred and ignite and set the house on fire. Terra-cotta linings to chimneys are a source of safety and cleanliness. So far as possible chimneys should be straight and have a smooth interior so as to facilitate the draught.

The Roof.—A good roof is an important part of a sanitary house. If not properly constructed it is a constant source of annoyance. Slate, tiles, zinc, copper, lead, tin and shingles all make substantial roofs. Tarred felt and gravel compositions are not to be recommended except for temporary structures. Metal roofs require but little slope, but the slope of slate, shingle or tile roofs should be steep. Great care should be taken in the arrangement and making of gutters, spouting and pipes.

Floors.—These should be of well-seasoned lumber and laid so as to

present a smooth, even surface, free from cracks. The plowed and grooved floor and the doweled floor have great advantages. Fire-proof floors are desirable but not adapted to ordinary dwellings. Basement floors should be of concrete.

Floor Coverings.—The inlaid floor composed of different woods and known as parquetry is ornamental and very effective when it is intended to dispense with carpets. Carpets were formerly much more used as floor coverings than at present. They are not a sanitary covering on account of their susceptibility to collect dust and dirt and they are difficult to remove and shake. The present fashion of abandoning the closely fitting carpets and substituting parquetry rugs and square carpets on stained or varnished floors is an important step toward effecting improvement in the sanitary condition of dwellings.

Wall Coverings.—For cottages and inexpensive dwellings no wall covering is better or healthier than lime whitewash. It may be rendered artistic by coloring, and can be renewed readily and cheaply. Paint answers as an excellent wall covering. It produces a smooth, hard, non-absorbent surface which can be washed when necessary. Paper is most used at present as a wall covering, but it is doubtful if it is a good sanitary covering, as it is absorbent of moisture and is very apt to become saturated with impurities in the heated air of rooms. Moreover, many wall papers are dangerous from the fact that some of their colors, especially the green, are derived from poisonous substances.

Woodwork.—The woodwork about the house may be stained and varnished, or oiled and polished, or painted. Natural wood, oiled and polished, or varnished, the pores first having been "filled," makes a most desirable finish, and is rapidly coming into general use. Whatever may be the choice in this respect it is important that the materials used shall, as far as possible, be impervious, and so applied as to present a smooth, even surface that will repel dust and dirt and admit of being easily cleaned. This recommendation applies with equal force to all the interior finishing of the house.

Internal Decorations and Furnishings.—The internal decoration and fittings or furnishing of the house may exert no inconsiderable influence on health, and it is therefore important that they conform, as far as possible, to the principles of sanitation, so as to conduce to the health as well as the comfort of the occupants. It is clearly evident that all furniture, which, by its excessive decoration or peculiar construction, collects and conceals dust and dirt that cannot be easily detected and removed; all heavy

drapery, so commonly hung in profusion about living and sleeping apartments, which cannot be cleaned with facility and which excludes light and air; all over-ornamentation of ceilings and cornices by elaborate mouldings which defy all attempts at cleansing; the so-called artistic furniture loaded down with ornaments of china and glass, and "what-not," which furnish so many hiding places for the ever-present dust; all these are, to a great extent, objectionable and unhealthy.

PART VIII OF BOOK III

Shows how necessary to health it is to remove all refuse matter, solid and liquid, from dwellings and their vicinity.

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PREVENTIVE MEDICINE

PART VIII.

SANITARY CLOSETS

The thorough removal of refuse matter, solid and liquid, from buildings and their vicinity, is indispensable to healthy life. Neglect of this is a cause of a vast number of preventable diseases.

Why Filth Produces Disease.—Accumulations of filth about houses taints air, water and soil. Septic particles, or ferments, given off in the putrefaction of organic matter, evolve the seeds of many diseases. Typhoid and enteric fevers are thus engendered. Privies and privy drainage and soakage have given rise to typhoid epidemics. Cholera, dysentery and allied diseases spring from the same source. Many other diseases owe their origin to filth poisons. Many suppose that consumption may be due to filth particles. Filth is the breeding place of the germs of diphtheria and other fatal diseases.

Safety in Cleanliness.—All refuse matter calculated to poison air, water or soil near a dwelling should be sedulously removed. This necessity exists everywhere, in city as well as in country.

Sources of Air and Water Pollution.—Nuisances traceable to air and water pollution are:

1. Defects of public sewerage.
2. Defects of house drainage.
3. Faults of cess-pool arrangement. No cess-pool should exist as a simple hole in the ground. It should be walled or bricked dry, and the bottom laid similarly. It should be frequently cleansed. No wells should be near it.

House Drainage.—Every house drain should insure the removal of all liquid refuse, waste-water and fecal matter, without leakage. The pipes should be of iron or earthen ware, for at least eight or ten feet distant from the house; but if a spring or well be near the piping should continue far beyond it. All pipes should be laid in a bed of clay, and the joints firmly cemented. Cement beds for pipes are the best.

Flushing of House-Drains.—All house-drains should be occasionally flushed by pouring large bodies of water into them. Field's flush tank is used for the purpose of flushing drains in the country.

Rain-Water Leaders.—A convenient plan of disposing of rain water is to pass it through the drain pipes. This affords an excellent flush, but care must be taken against freezing in winter; all conductors of rain water should be kept outside the house, lest the back gases should enter the house.

Dry System of Removing Excreta.—The dry system is adapted to towns and villages and to single cottages. It consists in the admixture of dried earth, coal ashes, or other dried refuse, with the excrement in sufficient quantity to absorb and reduce it to an inodorous form. The absorbent material must be perfectly dry, and must be applied immediately, and in sufficient quantity to cover the excretions and remove all fluidity. All slops and sink water and solid matter must be carefully excluded. In rural districts this plan can be made very satisfactory, but in towns it is seldom that the removal takes place sufficiently often to meet the requirements of the case. The receptacles should be made of impervious materials, and the closet should be located either out of doors, or in an isolated part of the building, or in an apartment projecting from the house. The apartment should be well ventilated.

The Earth-Closet System.—Moule's earth-closet system comes under the head of the dry-removal systems, and is the plan with which the public is most familiar. On account of the absorbing and deodorizing qualities of dried earth, this substance is selected for use in closets, especially within the house. The original apparatus, designed by Mr. Moule, consists of a wooden box divided into two main compartments. The lower one contains a receptacle or pail for the sewage, and the upper one the reservoir or hopper from which the dried earth is supplied in requisite quantity whenever the closet is used. The hopper in the upper part of the apparatus is capable of holding an ordinary coal-scuttle full of earth. A plug is attached to its outlet, and is operated by a lever connected with a handle. Beneath the seat is a guard, which directs the dried earth into the pail without allowing any of it to escape at the sides.

Construction of Sanitary Closet.—(1) A concrete bin, six feet long, three feet deep and two and one-half feet wide in measurements, divided into three compartments of equal size by concrete partitions, the first of which is built so as to leave a six-inch space at the bottom and the second a six-inch space at the top.

PART I OF BOOK IV

Treats of the eruptive diseases; their classification, prevention, symptoms and treatment.

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Book IV

CURATIVE MEDICINE

PART I.

THE ERUPTIVE DISEASES

The Plan and Scope of the Subject.—In this part of the work, the author proposes to give an outline of the natural history of each disease, advice as to the modes of preventing its onset when threatened, recommendations as to its hygienic management, hints as to its probable course, fatality, and ultimate results upon the system, if recovery takes place, and finally suggestions in regard to its medical treatment.

Home Value of the Book.—As already advised, the most skillful physician who can be procured should be called in to treat disease; but in the emergency, until he arrives, much can be done in accordance with the directions here given to allay the sufferings of the patient, to place him in a more favorable position for speedy recovery, and, above all, to prevent the calamity which has befallen him from becoming aggravated before the doctor comes, through want of proper care.

Manner of Treatment.—Since a large proportion of the "ills which flesh is heir to" are rarely seen in this country, and have therefore but little importance to inhabitants of the United States, except as matters of curiosity, it is proposed to give very brief notices of these infrequent maladies, in order to economize space for a fuller account of those prevalent diseases which, sometimes in their lives, will, alas, personally interest a majority of the readers of this book.

THE CLASSIFICATION OF DISEASE.

Among the almost innumerable methods of classifying diseases which afflict the human family, one of the latest, and probably the best, is that devised by the Royal College of Physicians of England, and adopted by

law as the basis for all those statistical reports relating to medical subjects of which the British nation is justly entitled to be proud. This, with some unimportant variations, is the system adhered to in the present section.

English Names for Diseases.—The plan of this nomenclature is to give an English name to the disease, employing the terms in popular use whenever they are not absolutely inaccurate, and to use only one word, or as few words as possible, in naming a disease. Definitions are attached to the English names in certain instances only, that is in cases where there might otherwise be some ambiguity in the signification of the title. The classification of diseases thus designated is based on their anatomical seat in the human body, the division being first into general diseases and local diseases.

General Diseases.—The general diseases are those which affect the whole frame, and are subdivided into two sections. The first comprehends those disorders which appear to involve a morbid state of the blood, and for the most part present the following characteristics. They run a definite course, are attended with fever, and frequently with eruptions on the skin; are more or less readily communicable from person to person, and possess the singular and important property of generally protecting those who suffer with them from a second attack; they are apt to occur as epidemics. Small-pox is a good example of this group, and in our ceaseless combat with disease it is with disorders of this section that hygiene and preventive medicine have won their grandest triumphs and accomplished their most beneficent work.

Constitutional Diseases.—The next of the general diseases comprises for the most part maladies which are apt to invade different parts of the same body, simultaneously or in succession. These disorders are sometimes spoken of as constitutional diseases, and they often manifest a tendency to transmission by inheritance. Gout and rheumatism furnish good illustrations of this type of disease.

Diseases of the Organs.—The second class, that of local diseases, comprehends all those which affect the structure of special organs, or particular parts of the human body, leading to marked disturbance of their functions. Diseases of the eye, such as cataract, and local inflammations, such as pneumonia or inflammation of the lungs, exemplify the characters of this group. Owing to the wonderfully close association and sympathy between all the different parts of the human frame, no one organ can suffer alone, and hence with the local diseases constitutional disturbances, such as fever, generally arise, and may totally mislead an inexperienced observer.

Recognition of Local Diseases.—The recognition of local disease in obscure cases is often, indeed, one of the most difficult problems a physician can be called upon to solve. Commonly complaint of pain in some particular part directs attention to that spot as the seat of primary disturbance, and leads to its thorough examination, which should be made with the aid of all the mechanical appliances, such as the stethoscope, the microscope, the thermometer, and so forth, which medical science has placed at our disposal. It is only when after all these means are exhausted, in a vain effort to detect local disease at the seat of pain or of pronounced discomfort, sufficient to account for that disturbance, that we are justified in considering local distress as a mere symptom of general disease.

Complicated Diseases.—Unfortunately, neither a general nor a local disease gives the sufferer any positive security against the onset of another malady at the same time, and we often see people burdened with a complication of disorders, each of which by its symptoms obscures the rest, and perhaps renders the proper treatment for them inadmissible. It is this tendency to the development of complications, either secondary to the chief disease or entirely independent of it, which in many affections is the indirect cause of death.

Damaged Organs.—Frequently, too, after a severe illness, some important organ is damaged in its structure, and the patient for the rest of his life suffers for want of its proper performance of function throughout his whole organism, which is really as much crippled in its work as a man would be if his leg or arm had been left upon a battlefield. This is especially the case with the heart after an attack of inflammatory rheumatism, which, by affecting the cardiac valves, prevents the circulation of the blood from being duly carried on, and, as it grows worse in later years, is apt to terminate existence abruptly by sudden death, or by the painful method of prolonged and lingering illness.

Care in Dosing.—The greatest care must be exercised in portioning out the doses of medicines suggested for the treatment of the diseases described, and it should always be recollected that a mistake which is a mere blunder in other vocations may at any moment become a crime in the occupations of prescribing, preparing, or administering medicines. Hence the doctor, the apothecary and the nurse, who have always the life of the patient in their keeping, should be persons who are willing and able to fully realize their responsibility; those who, whilst on duty, are unceasingly and vigilantly on guard against committing an error of any kind.

Doses Are Always for Adults.—The doses of medicines recommended in this section of the work are always for adults, unless otherwise expressly stated, and must be proportionately reduced for children according to age. Thus, for a young person of from fourteen to sixteen years, two-thirds of the ordinary dose should be given; from ten to thirteen, about one-half; from eight to ten, two-fifths; from six to eight, one-third; for a child of four or five years, one-fourth; for one of three years, one-fifth; for one of two years, one-seventh; for an infant of one year, one-thirteenth; and for a baby of from three to six months, one-twenty-fourth.

Doses for Children.—For example, the average dose of bromide of potassium for a grown person being twenty grains, that for a youth between fourteen and sixteen years would be sixteen grains; between ten and thirteen, ten grains; between eight and ten, eight grains; between six and eight, seven grains; between four and five, five grains; at three years, four grains; at two years, three grains; at one year, a grain and a half; and at six months, three-quarters of a grain.

How to Graduate Doses.—These fractional amounts are most conveniently arranged for young children by diluting a single dose for an adult with the requisite number of teaspoonfuls of pure water. That is to say, using the above illustration, if it is desired to administer bromide of potassium to a child one year old threatened with convulsions, twenty grains of the drug might be dissolved in thirteen teaspoonfuls of water, and a teaspoonful given every hour or two.

Why Doses Should Vary.—The doses of medicine vary, as already pointed out in the earlier part of this volume, in accordance with sex, idiosyncrasy and habit, and one of the most important advantages enjoyed by a skilled family physician is his power, gained by long practical experience, of so adapting each dose of medicine to every individual of a family, as to gain the greatest amount of benefit with the least amount of injury in any particular case.

Opiates and Emetics.—The general rule given above in regard to doses of medicines to children has some exceptions, the most important being in regard to opium, which is not well borne in childhood, and calomel or castor-oil, of which a larger proportionate quantity may be administered. In regard to the frequency of repetition of medicines, it should be understood that when not otherwise stated, this may be judged of by the effect produced. Thus, as a rule, an emetic may be repeated in fifteen minutes if the patient does not vomit; an opiate may be repeated in an hour if pain

still continues without mitigation, and a cathartic in from six to eight hours if no purgative action is effected.

Change of Medicines.—In those unfortunate patients who cannot take laudanum, morphia, or paregoric for the relief of pain, which constitutes the great symptom of disease, codeia, chloral, hyoscyamus, bromide of potassium, Indian hemp, and lactucarium may be used as substitutes, but without much expectation that they will fully serve the purpose of opium, that greatest boon to suffering humanity.

THE ERUPTIVE AND ACUTE INFECTIONS

SMALL-POX OR VARIOLA.

Definition.—An acute and highly contagious disease characterized (*a*) by an eruption, which by the third day is papular, by the sixth day is vesicular and by the ninth it becomes pustular (*b*) by a fever which appears with the onset, disappears with the eruption, but returns again when the eruption becomes pustular.

History.—Small-pox was first accurately described by Rhazes, an Arabian physician, in the ninth century, and distinguished by him from measles, but it is believed to be the same as the *pesta magna* described by Galen (A. D. 130-200). It is known to have prevailed during the sixth century and again about the time of the Crusades. The disease is believed to have been introduced into America by the Spaniards early in the sixteenth century.

Cause.—Small-pox is one of the most virulent of the contagious diseases, the poison of which is extremely tenacious of life; it may remain latent in clothes for a long time, and then be capable of exciting the disease. The contagion exists in the secretions and excretions, and in the exhalations from the lungs and skin. The dried scales constitute by far the most important element, becoming attached to clothing and furniture; and are conveyed by persons who have been in contact with the sick. The disease is probably contagious from a very early stage, though it has not yet been determined whether the contagion is active before the eruption develops. The degree of mildness or severity of a case does not influence that of another caused by it, the severest cases being at times followed by the mildest forms, and *vice versa*.

Age.—Unless protected by vaccination or a previous attack, nearly every one is susceptible, from the aged to the child in the womb. The disease is usually fatal in the very young.

Sex.—Male and female are equally affected.

Race.—The North American Indian and the negro are particularly susceptible to it.

Nature of the Disease.—The eruption consists in an infiltration of cells into the *rete mucosum* or into the true skin. Genuine pock marks are frequently found in the mouth, œsophagus and larynx and there are parenchymatous or soft cellular tissue degenerations in other organs.

Varieties.—Discrete, confluent, malignant and varioloid.

Symptoms.—1st. Discrete form: After a period of incubation of from nine to fifteen days (Osler), seven to twelve days (Tyson), the disease is ushered in with a chill in adults, and with a convulsion in children. There is an intense frontal headache and agonizing lumbar pains, and vomiting. The pains in the limbs and back are more severe in the initial stage of this than of any other eruptive fever, and connected with the frontal headache and vomiting are specially and decisively characteristic, or pathognomonic, of this disease.

Fever sets in rapidly and may go as high as 103 or 104 the first day; the pulse is rapid, hard and strong at this stage. Delirium may be present, and is at times violent. The face is flushed and the eyes are bright and clear.

The Eruption.—About the third or fourth day small red spots are noticed, first on the forehead and wrists, from which it rapidly spreads over the face and extremities. At this stage the eruption is not unlike measles, but in another twenty-four hours it is quite different, the papules having a "shot-like feeling," from which stage they pass into the other two stages mentioned in the definition. As the eruption comes out the fever falls, symptoms abate and the patient feels more comfortable. On the fifth or sixth days the papules become converted in the vesicles, which contains a clear fluid, the vesicle itself having a depressed or umbilicated centre. By the eighth or ninth day the vesicles are converted into pustules, the umbilication disappears and the fluid becomes a grayish-yellow, owing to the contained pus. At this stage the fever rises and the general symptoms return. In the discrete form the fever does not usually remain high for more than twenty-four or twenty-six hours, so that on the tenth or eleventh day the fever disappears and convalescence sets in. By the fourteenth day the pustules become dry, are converted into crusts and drop off, leaving, in mild cases, a simple discoloration which in time disappears, but in severe cases a more or less deep ulcer, or, if cicatrization be complete, a simple pit.

SMALL-POX.
Discrete or Separate Form.

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SMALL-POX.
Confluent or Enmassed Form.

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VARIOLOID.
Modified Small-Pox.

Symptoms of the Confluent Form.—2d. This form has the same initial symptoms as the discrete, but they are of greater severity. The eruption in this variety comes out earlier than in the above-mentioned form. Sydenham early called attention to the fact that the earlier the eruption appeared the more danger there was in its assuming the confluent variety. In this variety the fever does not abate on the appearance of the eruption as it does in the discrete form. The face, hands and feet present an almost continuous pustule, which often bursts in places, and, the pus partly drying, there results a picture which is horrible in the extreme. True pocks nearly always develop in the air passages, and give rise to a copious fetid discharge from the nose and throat. Should the patient recover it is only after a tedious convalescence, with great facial disfigurement and often with defective vision and hearing.

Malignant Form.—3d. In some cases this form of the disease is ushered in with a high fever, excruciating pains in the back and vomiting. The hemorrhagic rash appears early, while the hemorrhage takes place from the mucous membrane or surfaces, generally on the evening of the second or third day, and the patient may die in from two to six days, sometimes even before the eruption makes its appearance. The face is swollen and large conjunctival hemorrhages, with the deeply sunken corneæ, give a ghastly appearance to the features. The mind generally remains clear, but death is the usual result.

Varioloid.—4th. This is small-pox which is modified by a previous attack or by vaccination. The attack may come on with the symptoms as severe as in the discrete form, but usually the initial fever is less, the eruption is less general and may abort in its early development, the secondary fever is less marked and convalescence sets in earlier. Vesication, or blistering, takes place rapidly, as there is rarely any scarring.

Diagnosis.—The diagnosis or recognition of small-pox is of great importance, and many an anxious hour is often passed by the physician, the patient, and the friends of the latter before it is possible to decide with certainty as to the nature of the disease. While small-pox may be mistaken for a number of affections, the chief difficulty after the eruption begins to come out is in distinguishing it from measles and from chicken-pox. Of course, it is very important to make the diagnosis at the earliest possible moment, in order that timely precautions against the spreading of the disorder shall be instituted. After the pimples begin to contain fluid, the danger of mistaking the malady for measles is over, because the

general eruption of measles is never vesicular, although a few little blisters are occasionally seen in bad cases.

To Distinguish from Measles.—In many instances a probable opinion can be given that a disease is measles and not small-pox, from the fact that the eruption of pimples is softer, less shot-like, and arranged in obscurely defined crescents upon the arms and neck. In others, however, it is impossible to decide before the second day of the eruption, when, as a rule, some few of the pimples will be found slightly vesicular if the disease is small-pox.

To Distinguish from Chicken-Pox.—When the vesicles appear, the great point of distinction between them and the vesicles of chicken-pox is that the small-pox vesicle is depressed in the middle, giving it what is called the umbilicated or navel-like aspect. This is an important characteristic, and should always be carefully looked for. Before the eruption comes out, only a probable guess can be made in many instances.

Unusual Symptoms.—Dr. Flint, perhaps the most acute diagnostician in America, says that decided fever following immediately after a chill, the fever continuing without much remission for two days, pain in the back being a prominent symptom, if it be known that the patient has been exposed to small-pox, or if this disease is prevalent, renders the diagnosis extremely probable. In comparatively rare cases, unusual symptoms in an attack of small-pox might for a day or two render the diagnosis difficult from scarlet fever, the simple mild fever called febricula, the skin disease called lichen, some of the pustular eruptions of the venereal disease, and in its very earliest stage from erysipelas and typhoid fever.

Treatment.—Since we have as yet discovered no antidote for the small-pox poison, the chief treatment is the relief of symptoms, as far as possible, as they arise, and careful nursing, in order to avoid needless aggravation of the disease or the development of complications. The mildest cases, as well as those which are more severe, should be kept in bed in a cool apartment, which is ventilated as freely as possible, without producing dangerous draughts.

The Back.—In bad cases the patient's back ought to be frequently examined, and suitable precautions taken against the formation of bed-sores, as recommended under the head of typhoid fever, the hair cut off close, in order to avoid the matting with the corruption from the pustules when that begins to discharge.

The Bowels.—The bowels should be well opened as soon as fever develops with a tablespoonful of castor-oil, or a saline purgative, such as

Two children in the Municipal Hospital, one unvaccinated and the other vaccinated on the day of admission—the crust is still seen upon the leg. This child remained in the hospital with its mother (who was suffering from small-pox) for three weeks, and was discharged perfectly well. The unvaccinated child admitted with small-pox died. (Welch and Schamberg.)

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Three Members of a Family Brought to the Municipal Hospital with the Mother Who was Suffering from Small-pox. The child in the centre was unvaccinated; the other two had been vaccinated a year before because of the school vaccination requirements. These two children remained in the small-pox wards several weeks, and left the hospital perfectly well. (Welch and Schamberg.)

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a Seidlitz powder or a bottle of citrate of magnesia, and then a cooling and diaphoretic mixture, composed of half a teaspoonful of sweet spirits of nitre, ten grains of bromide of potassium, or phenacetum, four grains, every three or four hours, for fever, and an ice cap to the head for the violent headache, administered every two or three hours if there is much pain or restlessness. After the primary fever subsides, with the coming out of the eruption, there are often a few days during which no medical treatment is necessary; but with the appearance of the secondary fever, the cooling mixture should be resumed. Quinine, tincture of iron and brandy should be given in full doses.

The Itching.—To relieve the itching, which is sometimes almost intolerable, the surface of the skin may be sponged over with a weak solution of sulphurous acid or of carbolic acid, six or eight drops to the ounce of water. If no relief is obtained from these, anointing the body with cosmoline or with cold cream may be tried; but it is sometimes needful to muffle the hands, especially of children, in order to prevent them from scratching open the pocks after they begin to heal, and so rendering the resulting scars much deeper and more permanent. Keep the patient in a dark room and cover the face with a mask of mercurial ointment, and to prevent pitting the pustles may be touched with tincture of iodine.

The Fever.—The fever, when high, must be kept within limits, either by cold sponging or by the cold bath, the water being at a temperature of 75 degrees when the patient is first put in and then gradually lower it to 68 degrees. During convalescence bathing should be frequent, as it helps to soften the crusts. In malignant small-pox, which generally proves fatal, where very soon the face becomes so swollen that the eyelids are tightly closed and glued together, they should be frequently bathed with a saturated solution of boric acid. The mouth and nose should be kept clean and soft by frequent injections. The patient should have plenty of cold water. Should the heart become weak hypodermics of strychnine, one-thirtieth of a grain, or dram doses of aromatic spirits of ammonia by the mouth.

Treatment of Malignant Small-Pox.—In malignant small-pox, and in the petechial or hemmorrhagic form, the black small-pox of common language, the only chance of successful treatment is to support the strength with quinine in four-grain doses thrice daily, or Peruvian bark and other tonics, and with stimulants such as wine or brandy or milk-punch, in the forlorn hope that unusual vigor of the constitution may thus be reinforced long enough for the violence of the disease to become expended. If the

patient can thus be kept alive until after the twelfth or fifteenth day without any important organ becoming seriously damaged in its structure, the chance of recovery will subsequently increase every day. The disease being self-limited, it is obviously our chief duty, in the absence of any known specific, to direct our energies toward sustaining the patient's strength in his battle with the disorder, and the prospect of recovery, or prognosis, as it is termed, turns upon the relative power of endurance of the disease-poison and the patient's constitution.

Diet.—The diet in the early stage of small-pox, like that in most febrile conditions, should be light and unstimulating, consisting of rice, cornstarch, bread and milk, or arrow-root. Oranges or lemonade in moderation may be allowed, unless there is a tendency to diarrhœa. Ice water, lumps of ice, or iced carbonic acid water may be given *ad libitum*. Later on in the disorder, when the strength begins to fail and the pulse grows weaker, strong animal broths, beef essence, and other highly nutritious aliments are necessary; and if the pulse at the wrist should seem very feeble, and especially if it should become intermittent, milk-punch, egg-nogg, or other powerful stimulants ought to be resorted to.

Nursing in Small-Pox.—The general care of a small-pox patient ought to be afforded in accordance with directions contained in the chapter on Nursing, and most of the special precautions for avoiding the extension of the disease, and so forth, have been pointed out in the article on Contagious Influence. On account of the danger of pneumonia and pleurisy, particular watchfulness is needed against taking cold from draughts of air, and during the delirium of the fourth stage, in bad cases, the attendant must be constantly on guard to prevent the patient from injuring himself or others. The nurse should wear an overall and remove it on coming out of the room, and her head should be covered with a cap.

VACCINATION THE GREAT PREVENTIVE OF SMALL-POX.

Seeing, then, that small-pox is a most painful, loathsome, and fatal disease, for which we have no cure, it becomes infinitely important to avail ourselves of the protection against its ravages afforded by Dr. Jenner's beneficent discovery of vaccination, a discovery which ought to make his name honorable whilst the world stands.

And yet, strange to say, there are people bearing the general aspect of reasoning beings who oppose vaccination; and in England, where vaccination has been made compulsory by law, a league has been formed to

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VACCINATION.
Inflamed Condition.

VACCINATION.
Perfect Mark.

combat its enforcement. Recently the folly of these fanatics met, it is stated, with a most righteous punishment in the following circumstance: A leading anti-vaccinationist, Escott by name, who refused to have any of his children vaccinated, lately lost two of them and his wife by small-pox. Escott borrowed a suit of clothes from a friend to attend his wife's funeral, and returned them without disinfection, with the result that the lender caught small-pox and also died of it. Subsequently nearly every house in the neighborhood was infected, producing a local epidemic of small-pox, during which sixteen patients were removed to the pest-house. The only excuse for the obstinacy of such deluded people is, that more than half a century of deliverance from the horrors of small-pox has rendered most persons practically ignorant of its dangers. In the latter half of the eighteenth century, that is, from 1750 to 1800, small-pox attacked almost every inhabitant of England, and about one out of every five seized with it died, whilst nearly another fifth of its victims were disfigured or crippled for life. It is estimated that two-thirds of the blind people in England at that time lost their sight from small-pox. To give an idea of its relative mortality, Dr. Guy states that it caused eighteen per cent. of all the deaths, and was one hundred times as fatal as diarrhœa, with its allied intestinal disorders, and six times as fatal as apoplexy, palsy and sudden death taken together.

Objections to Vaccination.—These, aside from the mere sentimental ones are that in some instances erysipelas and venereal disease have been apparently caused by it, and that it has been accused of being the means of inoculating the human system with scrofula, consumption and certain cutaneous affections. Now, all of these objections can be removed by the use of what is called bovine virus, obtained direct from the cow, without ever having passed through any human body. Glycerinized lymph is now conceded to be the better vaccine virus.

Duty of Vaccination.—This is rendered far more imperative by the danger which every unprotected person in a community exposes his neighbors to by becoming the starting-point of an epidemic of small-pox. Hence, although a man may have the privilege of thus trifling with his own life and health, he has no right to imperil others by his perversity or ignorance; and the good of society, which is a higher law than that of personal liberty, demands that compulsory vaccination be legally established, as it is hoped it will be ere many years elapse.

Making Sure of Immunity.—Even after exposure the individual should be vaccinated, for though it may not prevent small-pox, it will cer-

tainly moderate the severity of the attack. The writer has had a case of this kind to come under his personal observation.

COW-POX OR THE VACCINE-DISEASE.

How Produced.—This disease, called Vaccina in medical books, is induced in the human being by the process of vaccination, either accidentally, as in the case of the young milkmaid who led Dr. Jenner to his grand discovery, or, as is usual nowadays, by being rubbed into a slight wound made for the purpose. It is apparently a modified form of small-pox, in which a cow-pox vesicle on the udder of a cow or heifer is the common original source of the infecting matter.

Character.—The disease is attended, as a rule, with no further eruption than the vesicle, ripening into a pustule at the point or points where the matter is inoculated. It is communicable by inoculation, but not by the other ordinary modes of infection, mild in its course, and yet, generally speaking, protective against small-pox.

Operation of Vaccination.—This is by no means so simple and unimportant as it seems at first sight, and it therefore ought always to be performed by a physician. It is better not to cut so deep in vaccinating as to cause much of a flow of blood, lest this fluid should wash the virus out of the incisions. The usual place for vaccinating is on the outside of the arm, an inch or two below the shoulder; but if the operation fails here, as is sometimes the case after repeated trials, an attempt may be made on the calf of the leg, just below the knee.

When to Vaccinate.—Vaccination should be performed on all children between the ages of one and three months, unless some special reason exists for its postponement, and it is recommended to insert the virus in four or five places close together, so as to produce several pustules, although, by a majority of physicians in this country, one pock is thought sufficient.

Revaccination.—Revaccination should be performed about once in seven years, as in some instances the protection afforded appears to wear out in that time; and, as there is no means of recognizing them, the safer way is to renew the vaccination.

The Virus.—The animal or bovine virus is supplied from carefully vaccinated calves by a number of producers in various parts of the country. It is usually furnished on little ivory points, shaped like a lancet-blade, or on pieces of quills. Either of these is to be moistened in pure water,

and then rubbed on a lightly scarified surface, prepared as already described. The bovine virus is apt to make a very sore arm, but has the great advantage of avoiding all possibility of introducing the horrible poison of venereal disease into the blood of the infant operated upon.

VARICELLA OR CHICKEN-POX.

For full description and treatment of this disease, peculiar to children, see CHILDREN'S DISEASES.

MEASLES OR RUBEOLA OR MORBILLI.

For full description and treatment of measles, see DISEASES OF CHILDREN

RUBELLA, ROTHELN OR GERMAN MEASLES.

Definition.—An acute infectious disease resembling both scarlet fever and measles, but differing from these in its short course, slight fever and freedom from complications.

Cause.—It is propagated by contagion and spreads with great rapidity.

Incubation.—About two weeks.

Symptoms.—This is a mild contagious affection, very similar in many respects to ordinary measles, but apparently differing from it, because neither disease affords any protection from the other. The color of the eruption is rather more rose-tint than in ordinary measles, the pimples are round instead of oval, and the crescentic arrangement is wanting or extremely obscure. Children are chiefly affected with German measles, although it also occurs after adult age is attained, but in any case the malady is so slight that the patients rarely feel sick enough to keep in bed, and no instances of death from the uncomplicated affection are recorded.

Treatment.—The treatment, diet and nursing appropriate to German measles are the same as those recommended in the ordinary form, in the few cases where any special care is needed.

SCARLET FEVER OR SCARLATINA.

For description and treatment of scarlet fever, see DISEASES OF CHILDREN.

BREAK-BONE FEVER OR DENGUE.

Synonyms.—Dandy, or break-bone fever.

Definition.—An acute and infectious disease characterized by febrile paroxysms; pain in the muscles and joints and sometimes by an eruption on the skin.

History and Geographical Distribution.—The disease was first recognized in 1779 in Cairo and in Java. The description by Benjamin Rush of the epidemic in Philadelphia in 1780 is one of the first and one of the very best articles ever written on the disease. S. H. Dickson gives a graphic description of the disease as it appeared in Charleston in 1828. Since that date there have been five or six widespread epidemics in tropical countries, the last occurring along the Gulf States in the summer of 1897, where for some time it was supposed to be yellow fever. None of the recent epidemics have extended to the Northern States, but in 1888 it prevailed as far north as Virginia.

Cause.—The rapidity of diffusion and the pandemic character are the two most important features of dengue. There is no disease, not even influenza, which attacks so large a proportion of the population. A micrococcus has been found in the blood of patients by McLaughlin, of Texas.

Symptoms—Incubation.—Three to five days, during which the patient feels well. Persons who catch this curious complaint are often attacked with it very suddenly, frequently in the night after retiring in their usual health. The temperature rises in a few hours to 103 degrees and in one or two days may reach 106 or 107 degrees, the skin becomes dry and hot, and the countenance indicates utter helplessness and prostration; with this febrile condition there is usually pain in the head, back, limbs and small joints, which latter swell up as in rheumatism. The pulse is rapid; loss of appetite, coated tongue, slight nocturnal delirium and concentrated urine. The pain may be so severe that the patient cannot move.

Duration.—The average duration of the first febrile stage is about forty-eight hours, although it may vary from twelve hours to three days, after which the symptoms begin to subside and a period of remission of two or three days occurs.

Debility and Eruption.—During this time general debility and muscular pains predominate, and fever is usually absent, but on the fourth day it reappears, and on the fifth or sixth an exanthematous eruption develops, which is sometimes more like the flush of erysipelas than the

papules of either measles or scarlet fever. The color, however, is not so intense, and it spreads over the whole body in forty-eight hours.

Pains and Swelling.—When the eruption reaches its height, painful swellings of the lymphatic glands of the neck, back of the head, armpits and groins occur. With this tumefaction of the glands, the nose, mouth and throat become implicated, swelling up and growing excessively painful. On the seventh or eighth day desquamation commences and the acute stage terminates.

Malady Not Fatal.—The victims of dengue are to be commiserated for the horrible and agonizing pains which they are called upon to suffer, and which are peculiar to the disease; but they may find some comfort in the assurance that the malady is rarely, if ever, fatal.

Recurrence of Pain.—The recurrence of the excruciating pains in the limbs at a time long after the subsidence of the fever must be borne in mind, as influencing any opinion ventured in regard to the probable duration of the illness.

Diagnosis.—The diagnosis of dengue must occasionally be made from rheumatism, measles, scarlet fever and erysipelas; but a complete history of the case can hardly fail to clear up any doubts, particularly if dandy fever is prevailing in the locality as an epidemic.

Remedies.—Since the malady is not a dangerous one, anodynes to relieve the excruciating suffering, especially hypodermic injections of one-eighth or one-sixth of a grain of morphia. During convalescence iodide of potash is recommended for the arthritic pains and tonics are indicated.

TYPHUS FEVER.

Synonyms.—Ship, jail or putrid fever.

Definition.—An acute infectious disease favored by closely crowding human beings together, characterized by sudden onset, a maculated rash, marked nervous symptoms and a termination by crisis about the end of the second week.

Causes.—It is excited by an unknown poison which is capable of being carried in the clothes. It is rare in America, though there were two mild epidemics in the Philadelphia Hospital in 1866 and in 1883; it is not uncommon in England and Ireland. Bad food, impure air and overcrowding are predisposing factors.

Incubation.—Incubation is placed at about twelve days, but may be less, and its duration from ten days to two weeks.

Symptoms.—The fever begins abruptly with severe pain in the head, back and limbs; extreme prostration, and fever which reaches its maximum (104 degrees to 105 degrees) in two or three days. The temperature remains high for about ten days when it falls by crisis (suddenly).

The Eruption.—It is a continued fever, attended with a dark-red or purplish mottled rash over the body, with great nervous prostration, restlessness and delirium, or dullness and stupor, but without any specific affection of the bowels. The eruption, which makes its appearance from the third to the eighth day of the disease, is at first slightly elevated and disappears when pressed upon with the finger; but after the second day from the time it comes out, it is persistent under pressure and continues to show this character until it fades, ten or twelve days afterward.

Fatality.—When it proves fatal, as it does in about fifteen per cent. of the cases, death usually occurs between the twelfth and twentieth days of the attack.

Advent Symptoms.—The advent of the disease is somewhat gradual, beginning with general soreness, discomfort and weariness, with loss of appetite and disturbed sleep. Shivering and a feeling of coldness, especially along the spine, sometimes amounting to an actual chill, not unfrequently mark the commencement and are soon followed by heat of skin, rise in temperature and severe frontal headache. This headache is occasionally very severe and rarely absent at first, but abates about the tenth day.

Disturbed Sleep.—Slumber is disturbed by dreams, is unrefreshing, and when the patient is not asleep there is a constant tendency to heaviness, the mind ceases to think and the attention cannot be concentrated upon any subject. He may lie with his eyes open, evidently not in slumber, yet indifferent or insensible to all which goes on around him.

Bodily Weakness.—This is frequently extreme, and the sufferer often voluntarily takes to his bed on the first day of his illness. This exhaustion and prostration is totally disproportionate to the amount of muscular exertion which has been made. The eyes, when examined, are found to be dull and heavy, the white portion injected or blood-shot and a peculiar dusky flush overspreads the cheek.

The Delirium.—As the days pass debility rapidly increases and delirium comes on the latter part of the first or early in the second week. In persons of nervous, excitable temperament it commences sooner and may appear on the third or fourth night of the fever, showing itself

primarily, perhaps, by a little confusion of thought on awaking from a restless doze.

The Tongue.—The tongue is coated at first with a white fur, but after six or eight days often may become dry, swollen and covered with thick, brownish crusts of mucus and cast-off epithelial cells, which make up what is called *sordes.*

The Bowels.—The bowels are, as a rule, constipated, and this should especially be borne in mind, because it forms an important distinguishing mark between this disease and typhoid fever, with which typhus was formerly confounded.

The Pulse.—The pulse is quickened from the outset and in grave cases continues to increase in rapidity until it may more than double its ordinary frequency, beating from one hundred and forty to one hundred and sixty times per minute.

Complications.—Broncho pneumonia is perhaps the most common complication. It may pass on to gangrene; in certain epidemics gangrene of the nose, hands and toes have occurred.

Diagnosis.—The diagnosis of typhus fever requires to be made in this country chiefly from typhoid fever and relapsing fever, but it is sometimes difficult to distinguish it at first from small-pox, plague, erysipelas and cerebro-spinal meningitis.

Treatment.—As the treatment, diet and nursing of typhus fever are similar in most respects to what is required in the far more common disease, typhoid fever, the reader is referred to our article upon the latter affection for further information.

Isolation.—When an epidemic of typhus fever breaks out in a crowded jail, hospital or tenement, the great cause of its prevalence should, of course, at once be abolished by separating those exposed to it as widely as possible and treating the sick in isolated sheds, huts or even in tents.

TYPHOID FEVER.

Symptoms.—Enteric fever, autumnal fever or typhus albuminalis.

Definition.—An acute infectious disease due to the implantation and proliferation of the bacillus of Eberth, characterized by ulceration of the lymph follicles of the intestines of the mesenteric glands and by an enlargement of the spleen.

Historical.—The disease is easy recognizable in the descriptions of Hippocrates (B. C. 460-357) and Galen (A. D. 130-200). Doubtless John

Huxam's "slow, nervous fever," described in his "Essay on Fevers" was the typhoid of the present day, and his "putrid malignant" the yellow fever of to-day. It was, however, the writings and teachings of the great French physician, Louis, which did most to disseminate a knowledge of the true nature of typhoid fever, to which he gave the name it bears. Among some of his pupils were the Americans W. W. Gerhard and C. W. Pennock of Philadelphia and James Jackson, Jr., of Boston. To the former, however, is due the great honor of having first clearly laid down the difference between typhoid and typhus.

Causes.—Typhoid fever prevails in temperate climates in which it constitutes the most continued fever. It is widely distributed throughout all parts of the world.

Seasons.—It prevails most in the autumn months, especially following a dry summer.

Sex.—Males and females are equally liable.

Age.—Typhoid fever is a disease of youth and adult life. The greatest susceptibility is between the ages of fifteen and twenty-five. It is rare after sixty and infants are seldom attacked.

Immunity.—As in other fevers, not all exposed to the infection take the disease. Some writers claim that one attack protects, but others claim that one attack predisposes to another.

THE BACILLI OF TYPHOID.

Bacilli in the Body.—The bacilli are found in the lymphoid tissues of the intestines, in the mesenteric glands, in the spleen, liver, bile and in the bone marrow. They also occur in irregular clumps in the contents of intestines and in the stools; they have also been found in the blood, urine, sweat and sputa.

Bacilli Outside the Body.—The bacilli retain their vitality in water for weeks, but disappear from ordinary water in competition with saprophytes in a few days. In milk they undergo rapid development without changing its appearance. They may increase in the soil and retain their vitality for months. They are not killed by freezing, but, as Pruden has shown, may live in ice for months.

MODES OF CONVEYING BACILLI.

1. **Contagion.**—The possibility of the direct transmission through the air from one person to another must be acknowledged, although, as

shown by Germano, when completely dried in air currents, the specific bacillus quickly dies. There are house epidemics in which water and food contamination can almost be excluded. The nurses and attendants who have to do with the stools and body linen of the patient are alone liable to direct infection.

2. **Infection of Water.**—This is unquestionably the most common mode of conveyance. Many epidemics have been shown to have originated in the contamination of a well or a spring.

3. **Milk.**—Milk may be the source of infection, as it may be contaminated in washing out the cans with infected water.

4. **Ice and Salads.**—In addition, the germs may be conveyed in ice, salad, celery, and so forth. A fly which has alighted on the soiled linen or discharges from a patient may contaminate the milk or food.

Bad Sewage and Drainage.—Filth, bad sewers or cess-pools cannot in themselves cause typhoid fever, but they furnish the conditions suitable for the preservation of the bacillus.

Symptoms.—Typhoid fever, also called gastro-enteric fever, owing to the circumstance that the stomach and intestines are the chief seats of the disease, is characterized by a faint, scanty eruption of rose-colored spots, appearing chiefly upon the abdomen, from the fourth to the eighth day, and coming out in successive crops. Each crop of spots continues visible for about three days.

Cess-Pool Fever.—On account of its frequent connection with bad drainage, this fever has received the vulgar but expressive name of "drain or cess-pool fever," which, despite its indelicacy, it would be well to perpetuate as a constant warning against that neglect of sanitary arrangements in buildings to which it is chiefly due.

Initial Symptoms.—The onset of this dangerous and fearfully prevalent disease is very often a gradual one. The patient for some days feels weak, languid and depressed, loses his appetite, suffers from headache, and is restless at night. In other cases, however, the malady begins with a slight chill, or a feeling of coldness running up and down the back, and among children the first decided symptom may be an attack of convulsions. Frequently, too, slight bleeding of the nose is noticed, and a little tendency to looseness of the bowels, which may even be aggravated by errors in diet, or other imprudence, into active diarrhœa.

Secondary Symptoms.—After the stage of invasion is completed, the pulse and temperature rise steadily, the former going up to 100 beats or 110 beats, and the latter ascending to 104 degrees, or sometimes 105

degrees during the first week. The heat of the body is almost always greater at night than in the morning, and this increment is so regularly advanced during the onset of the disease, that it is quite possible for a skilled physician to recognize typhoid fever by a glance at the record of temperature, or "temperature chart," alone in many instances.

The Diarrhœa.—The diarrhœa rapidly grows more severe, and in bad cases is frequently very profuse, fifteen or twenty thin, watery evacuations occurring in every twenty-four hours. In many cases the bowels are constipated. Pain in the abdomen, especially in the region of the right flank, is nearly always complained of, and with the diarrhœa is due to the characteristic ulceration of certain oval spots in the lower portion of the small intestine, which have received the names of Peyer's patches. Bronchial irritation and cough are common.

Facial Appearance.—The face sometimes wears an anxious, haggard look, but frequently, even early in the disease, it shows the dull, indifferent aspect, so often indicating an oppression of the brain, which will deepen into stupor, then coma and finally death. The flush of the face is apt to have a more dusky, purplish tint than in other fevers, and the skin is more dry and burning, or pungent, from the smaller amount of perspiration.

The Delirium.—In the second week delirium generally comes on, and although occasionally violent and requiring the patient to be controlled by physical force, it is more frequently of a low, muttering character. The tongue becomes dry and brown, and tympanites, or the accumulation of gas in the bowels, is generally considerable, and may cause by its enormous distension great suffering, or even lead directly to a fatal result. Ringing or buzzing in the ears with deafness is very often noticed. In bad cases the diarrhœa is often very profuse, and discharges of fluid blood, perhaps in large quantity, sometimes occur and prove quickly fatal.

The Third Week.—In the third week, if the case is to end unfavorably, the pulse grows frequent and feeble, the tongue is dry, cracked and covered with brown sordes, the delirium and stupor are constant, involuntary discharges from the bowels occur, and the patient may die exhausted, or if the fatal issue comes earlier, before complete prostration of muscular strength, it may be preceded by convulsions.

Signs of Recovery.—If, on the contrary, recovery awaits the patient, the pulse falls off in frequency, the temperature gradually diminishes, the tongue cleans off usually from the edges, appetite slowly returns and the mental powers are little by little regained.

Unfavorable Symptoms.—The unfavorable symptoms, besides those above mentioned, are an unusually high temperature, 106 degrees or over, picking at the bedclothes, slipping down in the bed, and entreaties, often of pitiful earnestness, to be taken home.

Special Features and Symptoms.—1. A severe facial neuralgia may put the practitioner off his guard. In cases when the patient has kept up, "fought the disease," the first manifestation may be pronounced delirium. In rare cases the disease sets in with the most intense cerebro-spinal symptoms, simulating meningitis.

2. There may be pronounced pulmonary symptoms. In a few cases the disease sets in with a single chill, with pain in the side and all the characteristic features of lobar pneumonia.

3. There may be intense gastro-intestinal irritation. Occasionally there are cases with such intense vomiting and diarrhœa that poisoning may be suspected.

Fever.—The fever has invariably a step-ladder rise; the evening temperature is from one to one and one-half degrees higher than the morning remission.

Fever of Convalescence.—After the temperature has been normal for five or six days the fever may rise suddenly to 102 degrees or 103 degrees, and after persisting from one to three or more days fall to normal. With this condition there is no furring of the tongue and no distension of the abdomen. This condition is by no means uncommon, and is of especial importance, as it is attributed in most cases to errors in diet, constipation, or excitement of any sort, such as seeing friends.

Complications.—1. Thrombosis of the femoral vein, more frequently on the left side, resulting in the "milk leg." It occurs, according to Murchison, in one per cent. of all cases. Embolic abscesses may occur in the kidneys and lungs.

2. Albuminuria is present to some extent in all severe cases, commonly as the result of the fever, but sometimes is the direct result of an acute nephritis.

3. Hemorrhages usually occur during the third week, and are indicated by a sudden fall of temperature, followed by dark red or tarry stools.

4. Cardiac complications, including pericarditis, endocarditis and myocarditis, are sometimes present. The latter may be the cause of sudden death.

5. Peritonitis may result from perforation or from extension by continuity; the former is more common and is recognized by a sudden pain,

a fall of temperature, distension of the belly and symptoms of peritonitis.

6. Pneumonia may supervene in the second or third week of a typhoid fever, as a complication, in which the true relation is difficult to determine.

Diagnosis.—The diagnosis of typhoid fever must be made in its early stage from typhus fever, relapsing fever, scarlet fever, measles and smallpox. At a more advanced period it might be confounded with the typhoid condition met with in uremia and pyemia, and also with enteritis or inflammation of the bowels, peritonitis or inflammation of the membrane covering the intestines, meningitis or inflammation of the membranes of the brain, acute bronchitis or pneumonia, and with acute consumption.

The Rose-Colored Spots.—If a patient who has been suffering from headache, prostration, loss of appetite, restlessness and gradually increasing fever, has a slight bleeding at the nose unprovoked by accident, we may strongly suspect typhoid; but until the rose-colored spots appear there is no certainty.

Treatment.—The medical treatment in typhoid fever must be directed toward mitigating suffering, warding off complications and obviating the tendency to death. In the early stages of the complaint headache is one of the most prominent symptoms. All we can hope for is to procure some mitigation of the intense suffering it frequently occasions.

Ice Application.—The application of ice to the head, either in a bladder or India-rubber bag, or, what is still better, by means of an ice-cap, made of numerous coils of thin rubber pipe, through which ice-water is kept flowing, generally diminishes the pain, which, if very intense, may require the application of one of two leeches behind the ears.

For Checking Diarrhœa.—Diarrhœa, if troublesome, is to be checked, but not stopped by chalk-mixture, bismuth-mixture or astringents with opium, when necessary.

Creosote ..... 6 drops
Bismuth subnitrate ..... 3 drachms
Mix and make into 12 papers and take one every three hours.

Or, when ordinary measures fail—

Silver nitrate ..... 5 grains
Extract of gentian..... 4 "
Mix and put into pills, making 20. Take one every three hours.

Its use, however, after the first few days, must be continued with great caution, on account of permanently blackening the patient's skin.

Rest.—Absolute rest in bed, with the use of the bed pan, must be enforced.

Rendering Stools Innocuous.—The stools should be rendered innocuous. This may be done by dissolving a pound of the chloride of lime in four gallons of water. Add a quart of this solution to each discharge and allow it to remain in the vessel at least an hour before disposing of it. Soiled bed clothes should be thoroughly boiled.

Restlessness.—In cases where restlessness rather than stupor predominates small doses of bromide of potassium or a five-grain suppository of powdered asafœtida in the bowel will allay the condition. When the tongue becomes dry, ten drops of the oil of turpentine given in mucilage every four hours, often have a very happy effect, and its influence upon the healing of the intestinal ulcerations is highly lauded, while it aids in the expulsion of the gas.

Stimulants.—Generally, during the second week, sometimes a few days earlier, and occasionally a few days later, according to the violence of the attack and the patient's strength of constitution, it is advisable to begin with the use of stimulants. The best indication of their becoming needful is a slight failure of the strength of the pulse, but much experience is necessary to judge correctly of the time, the quantity, and the frequency with which alcohol be administered.

Kinds of Stimulants.—At first half an ounce of good whiskey or brandy, with two or three ounces of milk and half an ounce of lime-water, if nausea persists, may be allowed three times daily, but this amount must generally be increased from day to day, sometimes with great rapidity, until in the worst cases a pint and a half of brandy is swallowed in twenty-four hours. Beef tea, beef essence, and some farinaceous food, such as arrow-root or cornstarch, ought also to be urged upon the patient at this time.

To Stop Hemorrhages.—In cases of hemorrhage from the bowels, ergotin hypodermically, in full doses, fred. extract of ergot by the mouth or morphia hypodermically; and if perforation of the intestine, in consequence of the eating through of one of the ulcers, takes place, the very slender hope of recovery is increased a little by the administration of large doses of a grain every hour of opium and by securing perfect rest in bed.

Hydrotherapy.—Since many of the worst symptoms of typhoid fever

seem to be due to the effect of overheated blood upon the brain, efforts to reduce the temperature by the aid of cool baths of about 70 degrees Fahrenheit six or eight times daily, or cold sponging of the whole body, have of late years taken a very prominent place in the treatment of the disease, and are believed to reduce markedly its rate of mortality. Where, in spite of judicious employment of means to bring down the temperature, unconsciousness continues, great watchfulness is necessary in regard to the evacuation of the bladder, which may become dangerously distended, and even burst for want of attention.

Drawing the Urine.—When examined and found to be over-full, the urine should be at once drawn off by means of a catheter, and the operation repeated twice or thrice every twenty-four hours, until the patient resumes control over his functions.

Other treatment would be the

1. **Sponge Bath.**—The water should be cold or ice-cold, according to height of fever, and a thorough sponge bath should take from fifteen to twenty minutes. I have added alcohol to the water with good results.

2. **Cold Pack.**—If tub is not available the patient may be wrapped up in a sheet wrung out of water at 60 degrees to 65 degrees and then cold water sprinkled over him with a watering pot.

3. **The Bath.**—The tub should be long enough so that the patient can be completely covered, except his head. Every third hour, if temperature is above 102 degrees, the patient is placed in a bath at 70 degrees Fahrenheit, which, after the patient is put in, can be lowered a degree or two. In it he remains for fifteen or twenty minutes. He is then taken out, wrapped up in a dry sheet and covered with a blanket. The patient's limbs and body are gently rubbed while in the bath, and on removing he should have a stimulant. Rectal temperature should be taken directly after the bath, and again forty-five minutes later. Should the patient be too weak for the bath, frequent sponging or Leiter's coils should be used.

Constipation.—Should constipation be present, though as a rule it does no harm, it is well every third or fourth day to give an enema. If a laxative is needed during the disease give Hunyadi-János water.

Hemorrhage.—Should hemorrhage exist it should be treated with full doses of opium and acetate of lead. Ice should be freely given, and food should be restricted for eight or ten hours. If there should be any symptoms of collapse give stimulants.

Diet.—The diet of a typhoid fever patient must be watched over with

unceasing vigilance, as upon it and proper nursing, more than upon medical treatment, the chances of success often depend. In the first stages it should be light, entirely unstimulating and unrelaxing to the bowels.

No Solid Food.—Throughout the whole course of the disease no solid food ought to be allowed, and this precaution should be rigidly enforced on account of thereby avoiding the risk of mechanically rupturing some little hole in the intestine, at the seat of an ulcer which had almost perforated the wall of the bowel. Such a catastrophe must, as already hinted, lead to almost certain death.

Drink.—As the thirst is usually very great, whilst the appetite is nearly lost, it is a good plan to make the drinks somewhat nourishing in order to support the strength. Hence, gum-arabic water, barley-water, albumen-water or milk thickened with tapioca, sago or cornstarch are often highly advantageous.

No Fruits.—If the usual tendency to diarrhœa is at all marked, fruits of all kinds ought to be entirely withheld by the nurse, and even where the bowels are not disordered, fruits and vegetables, other than those enumerated, should be very cautiously given, on account of the disposition to looseness of the bowels which generally exists. Many cases of death from typhoid fever may be directly traced to the murderous imprudence of nurses and attendants in this respect.

Diet for Second Week.—During the second week, when slight indications of debility usually begin to manifest themselves, a more nutritious diet becomes necessary. Thicker preparations of the farinaceous foods above mentioned should be employed, beef tea and beef essence may be added to the list, and as debility increases eggs beaten up with milk, flavored perhaps with a little wine, if they have been well borne during health, may be administered. In the latter stages, when the whole capacity of the enfeebled digestive organs is needed to take up sufficient food to sustain life, strong meat-soup, beef essence, eggs beaten up with wine, and milk punch should alone be urged upon the patient.

Injected Food.—Life has apparently been saved in some instances by frequently repeated small injections of beef essence, brandy and milk, with a few drops of laudanum, in order to prevent the enema from being rejected from the bowels, as is often the case in spite of all our efforts.

Nursing.—In nursing the case of a typhoid fever patient, watchful and judicious care of a skillful attendant often contributes in those instances having a favorable termination, as most candid physicians will admit, more than medical treatment to the sick man's recovery. The

suitable administration of medicines to control diarrhœa, according to the varying phases of that important symptom; to relieve restlessness and allay excitement; the proper employment of baths to reduce febrile heat and diminish cerebral congestion; the constant guarding of the patient from injurious articles of food; the increasing effort to economize the failing strength, which otherwise may prove just a little lacking in the last great day of struggle with the disease, notwithstanding all the reinforcements called upon in the way of stimulants and nutrients to support it, all these offer an ample field for the highest intelligence and the noblest self-sacrifice.

Watching the Delirium.—The attendant upon a typhoid fever case must be on his guard, lest in his momentary absence the delirious patient gets out of bed and attempts to escape from the house, or perhaps throws himself out of a window. Even the effort at walking across the room may, in the weak conditions met with in the latter portion of the fever, so exhaust the failing strength as to lead to dangerous or fatal collapse.

Treating Bed-Sores.—The tendency to bed-sores, which are particularly apt to form over the portions of the body pressed upon in lying upon the back during typhoid and typhus fevers, must be overcome, as far as possible, by frequent change of position, the use of perforated pillows or cushions and of water-beds, and the patient should be well rubbed with alcohol twice a day, especial care being used over the parts of the body that the patient rests on while in bed, *i. e.*, back, buttock, and so forth. As a general rule, the formation of a bed-sore in a case of typhoid fever not lasting more than twenty-five to thirty days, is evidence of carelessness on the part of the nurse, and should never be permitted to occur. When once developed, bed-sores must be kept clean and carefully dressed once or twice daily, in the hope of preventing them from spreading, as the chance of curing them until the patient can sit up is exceedingly small. Not only is the suffering from bed-sores very great, but the free discharge of pus which they generally yield is extremely debilitating and quickly exhausts the little remaining stock of strength.

Typhoid Mortality.—The mortality of typhoid fever varies in different epidemics from 10 to 20 per cent. The older the patient the less is his chance of recovery from the malady, whilst among children the proportion of deaths is quite small.

Walking Typhoid.—Some of the mildest cases, those to which the name of "walking typhoid" has been appropriately applied, may suddenly terminate in perforation of the bowel, and death in a few hours from

collapse or from peritonitis. On this account a typhoid fever patient, no matter how slight his symptoms of illness may be, should stay in bed, and swallow nothing but liquid food, until the searching test of the thermometer shows that all febrile movement has subsided.

Management of Convalescence.—Even after convalescence has fairly set in, great watchfulness is necessary. Permission to sit up in bed even ought not to be given until several days have passed without any fever, as proved by the thermometer, which should be used morning and evening throughout the complaint, and the return to solid food must be both slow and gradual. Any imprudence in diet, or slight over-exertion, may bring on a relapse, which is much worse than the original attack, and its causes ought therefore to be most sedulously shunned.

Prevention of Typhoid.—The great means of preventing typhoid fever by unceasing vigilance in regard to the purity of the water, milk and air supply has already been urgently insisted on. Prevention of typhoid is now being carried out in the army and institutions by means of hypodermic injections of bacterius.

CEREBRO-SPINAL FEVER OR SPOTTED FEVER.

Definition.—An infectious disease occurring sporadically and in epidemics, caused by a diplococcus, characterized by an inflammation of the cerebro-spinal meninges and symptoms of great pain in the head, back and limbs, convulsions, irregular fever, and at times petechial eruption.

History.—In 1801 Vieussens first described a small outbreak in Geneva. There had been several outbreaks in the United States prior to 1875, but since that time there have been several extensive epidemics. There was a serious epidemic in Western Maryland in 1892, in New York in 1893, and from the spring of 1896 to the spring of 1898 the disease has prevailed extensively in Boston and its neighboring towns.

Causes.—Over-crowding, poor food, foul air and bad drinking water seem to be the predisposing causes. The epidemics have occurred most frequently in winter and spring. The concentration of individuals, as of troops in barracks, seems to be a special factor; in civil life children and young adults seem most susceptible.

Symptoms.—Many different forms have been described, but they are best grouped into three classes:

1. **Ordinary Form.**—This is a malignant epidemic fever, usually attended with painful contraction of the muscles of the neck and retraction

of the head, and frequently accompanied by a profuse purpuric eruption. It is a disease which generally comes on suddenly, runs its course with great rapidity, and proves fatal in a majority of instances. The malady is more than a mere inflammation of the membranes of the brain, or meningitis, for the whole nervous system seems to be very gravely affected from the first.

Premonitory Symptoms.—Premonitory symptoms are rare, but when they are met with, show themselves simply as slight headache and pain in the back, or a little uneasiness and weariness experienced for several days before acute symptoms set in. These may commence with a chill or marked shivering-fit, followed by intense vertigo, headache of intolerable severity, obstinate and violent vomiting, painful muscular stiffness, soon developing into continuous spasms, affecting particularly the muscles of the head and back.

Head Distress.—Distress in the head is constant so long as consciousness lasts. The eyes are blood-shot, and express agonizing suffering, the pupils are contracted, and the countenance is pale. Excessive restlessness and general muscular agitation prevail, and the sensibility of the whole surface is so great that every touch and movement causes excruciating pain, and even touching the hair is painful.

Third Day Symptoms.—These symptoms increase up to the third or fourth day, when the power of swallowing begins to be affected, and the process of respiration to be imperfectly and irregularly performed, the head being dragged tightly back as far as possible, and the features fixed in the horrible and characteristic grin of lockjaw. The delirium usually developed during the third day, if it has not sooner appeared, passes into stupor, and this in its turn deepens into coma, from which or from suffocation death commonly releases the sufferer between the fifth and eighth day of the complaint, or in a few cases the patient may gradually improve, and after three or four weeks enter upon a tedious convalescence of many months' duration.

2. **Malignant Form.**—There is an abrupt onset with a chill, followed by vomiting, headache, moderate fever, convulsions and rash.

3. **Abortive Form.**—The disease begins abruptly with grave symtoms, but terminates in a few days in recovery.

Diagnosis.—The diagnosis between this disease—which, if should be stated, has also been named epidemic cerebro-spinal meningitis, or purpuric fever—and typhus fever, typhoid fever, tetanus or lockjaw, tubercular meningitis and typhoid pneumonia, is usually not difficult, except in

the earliest stages. The fact of its epidemic prevalence generally aids at once to its recognition, except in the first few cases which occur, and even in these the intolerable headache, retraction of the head, and excessive sensitiveness of even the hair to the lightest touch, are almost always sufficient to characterize this strange and terrible malady.

Complications.—Deceptive vision from inflammation of the cornea or atrophy of the optic nerve; defective hearing from inflammation of the auditory nerve or from suppurative inflammation of the middle ear. Pleurisy, pericarditis and parotitis are not uncommon, and headaches more or less severe may remain for months or years.

Treatment.—The treatment consists of dry or wet cups to the nape of the neck and along the spine, cold to the head by means of ice-bags or bladders, or better still the ice-cap, opium in quantities of a grain every two or three hours, and especially hypodermic injections of morphia, to relieve the agonizing suffering as well as for the direct curative effect which opiates seem to possess in some instances, and iodide of potassium, in full doses of five grains every four hours, is indicated during convalescence, and blisters to the spine are also highly recommended.

General Remarks as to Prevention.—Cerebro-spinal Meningitis is a very contagious disease with a very high death rate. Death may occur within a few hours to a few days. It is caused by a germ which is found in the fluid in the spinal cord.

Outbreaks are more common in the winter and spring than in warm weather. It occurs both in large cities and sparsely settled country places. Its development is favored by the presence of filth, exposure to cold and wet, overwork, injury to the head, etc. Individuals of all occupations and professions can catch this disease. Its danger lies in its being a disease especially of children and young adults. After forty years of age it is rare, though in a severe epidemic anyone is liable to catch it.

The early symptoms of cerebro-spinal meningitis consist of a child or adult being seized with a violent headache, chill, nausea and vomiting. The patient is dizzy and acts like a drunken person. Dragging pains occur in the neck which extend along the spine and into the legs and arms. The patient suffers agonizing pain upon bending the head forward or from side to side. Later convulsions develop, and the patient becomes rigid, with only the back of his head and heels touching the bed. The back is arched, eyes may be crossed and bulging and he presents a terrible and hopeless picture of suffering and despair. The slightest touch will pro-

duce pain and cause the patient to utter terrifying screams. Delirium develops, followed by stupor, and unles the patient has a good constitution and receives special care and treatment, death follows.

The rash of spotted fevers occurs as tiny scattered reddish spots, some are dark or purplish red and contain, when stuck with a needle, a reddish fluid. In the severe cases death may occur in a few hours.

The germ causing this disease is supposed to enter the body through the mouth and nose and finally reaches the brain and spinal cord.

The after effects of spotted fever are what makes the disease so dangerous. Thus various forms of paralysis, loss of intelligence, due to the brain having been inflamed (meningitis), complete deafness and loss of vision.

The spread of the disease can be prevented by a person following the laws of personal cleanliness, and removing all filth, dust, etc., from about the premises. Avoid catching a cold, and do not approach a house where a case is.

Every case of spotted fever must be reported to the health authorities by the physician or guardian of the patient. Don't wait a minute. If there is a case in your neighborhood, be on guard and at the slightest sign of any child or young adult being taken ill with the symptoms, mention the above, summon your physician or the nearest health authority.

The patient must be placed in a darkened, well-ventilated room. Screen all doors and windows. The attendant or nurse must not leave the room without leaving the clothing inside and the hands must be dipped in chloride of lime.

The Board of Health will place a placard on the front and back doors. Whenever possible, send the patient to the contagious hospital. All bed linen, clothing, dishes, etc., must be dipped in chloride of lime solution (one-half pound to a pail of water) before being washed. All cloths in which the discharges from the nose and throat have been collected must be burned. The kissing of patients is dangerous as the disease may be contracted in this manner. No one must enter or leave the room in which the patient is confined except the doctor or nurse.

After recovery, the room must be fumigated by the Board of Health. Leave in the room all clothing worn by the patient and nurse, bed linen, carpets, curtains, etc., must be spread out so that the disinfectant can destroy all germs. Kill all flies or mosquitoes seen in or about the room or house, as they carry the disease.

RELAPSING FEVER OR FEBRIS RECURRENS.

Definition.—It is an infectious disease caused by the spirochetes of Obermeier, characterized by a definite febrile paroxysm which usually lasts six days, and is followed by a remission of the same length of time, then by a second paroxysm, which may be repeated three or four times.

Cause.—This disease is also known as "famine fever" and "seven-day fever." The special conditions under which it develops are similar to those of typhus fever.

Symptoms.—Period of incubation appears to be short and in some cases the attack develops promptly after exposure, more frequently, however, from five to eight days. Its onset is usually abrupt, without any preliminary symptoms, and the febrile attacks, usually severe though of short duration, pass away leaving the patient comparatively well for a few days. After an interval of about a week, however, a repetition of the primary attack is experienced, and this relapse, from which the disease takes its name, may recur four or even five times.

Blood Germs.—Relapsing fever is remarkable for being the first human febrile affection of a paroxysmal character which has been definitely connected with the development of a vegetable organism in the blood. The peculiar vegetable organisms belonging to the spirochetes are found in the blood of relapsing fever patients by tens of thousands, and disappear during the temporary convalescence, to reappear with the recurrence of the febrile attack.

Symptoms Beginning.—The onset of the malady is marked by a chill or shivering-fit, severe headache, vomiting and often jaundice; a white, moist tongue, tenderness over the pit of the stomach, constipation, enlarged liver and spleen, high-colored urine, a frequent, full and often bounding pulse, pains in the back and limbs, and frequently delirium.

Further Symptoms.—These symptoms abruptly terminate between the fifth and eighth day, as a general rule, by an exceedingly copious perspiration, and, after an interval of a week, during which it may be supposed that a new crop of bacteria are ripening, and in which time the patient is often well enough to get up and walk about, a sudden relapse takes place, running through the same phases as the original outbreak, except, perhaps, that it is a little shorter.

At Death.—When death occurs, it is apt to happen from a fainting-fit, following excessive perspiration, or from coma, the result of suppres-

sion of the renal secretion, but as seen in America the fatality is very small, being on an average less than two per cent.

Diagnosis.—The diagnosis of relapsing fever cannot be positively made by the general symptoms during the primary onset, but may be strongly suspected, and the relapse looked for if the disease is prevailing, and exposure to the contagion has occurred. A microscopic examination of the blood during the height of the febrile movement will, however, determine the presence of the spiro-bacteria, and this investigation ought therefore always to be made.

1. **Treatment.**—Although so far advanced in our knowledge in regard to the vegetable nature of the true contagion of relapsing fever, we have not yet made equal progress in the specific treatment of this complaint. The great problem, of course, is to find some mineral substance which can be taken up in the blood in sufficient quantities to check or prevent the growth of the bacteria in that vital fluid, without seriously injuring the patient himself. Quinine, so useful in intermittent fever, has proved almost worthless in this disease, and our chief reliance to reduce the high temperature is at present on cool baths or cold sponging.

2. **For the Headache.**—If the headache is very severe, dry cups to the back of the neck and along the spine may be employed, or one or two leeches may be applied behind the ears, although, since the tendency of the disease is toward great debility, it is better to avoid the abstraction of blood if possible. Opium or morphia by the stomach, or still better by hypodermic injection, is often necessary to relieve the headache and the severe pain in the limbs, and if symptoms of prostration come on early, wine or brandy must be resorted to.

3. **The Urine.**—A very careful watch must be maintained over the functions of the kidneys, since one of the great dangers of the disease appears to be the failure of these organs to perform their duty of purifying the blood from urea, which, when allowed by renal negligence to accumulate in the system frequently causes death by uremic poisoning. The urine should, therefore, be frequently examined, its total daily quantity noted, and the existence of albumen tested for. On account of its favorable action on the kidneys, sweet spirits of nitre in quantities of a teaspoonful every four hours is particularly applicable.

4. **For the Pain.**—For the muscular pains it is reasonable to expect that phenacetine, antifebrin or antipyrin will be of great service. The febrile paroxysm demands much the same treatment as typhus fever. Sponging or cold baths and nutritious and easily assimilated food.

FEBRICULA OR EPHEMERAL FEVER.

Definition.—A fever of short duration, depending on a variety of irritative causes. A febrile movement, lasting twenty-four hours and then disappearing, may for convenience be called ephemeral fever; if of three or four days' duration, febricula.

Causes.—The most frequent cause of this form of fever is probably the ingestion of foods difficult of digestion. As a rule dyspepsia is perhaps the most frequent cause of such a fever. This is especially the case with children, where it is often spoken of as gastric fever. Another cause is exposure to cold, insufficient to produce bronchitis, tonsilitis or some other affection too slight to be recognized by the usual signs.

Symptoms.—The symptoms of irritative fever are those usual to fever in a mild degree, *i. e.*, moderate elevation of temperature rarely above 103 degree Fahrenheit, frequent pulse, flushed face, headache, sense of lassitude and weariness, loss of appetite, nausea and restlessness; in children perhaps delirium. The fever is apt to terminate suddenly by crisis on the third or fourth day.

Diagnosis.—Typhoid fever—at first the diagnosis may be impossible, but the absence of diarrhœa, tympanites, abdominal tenderness, spleenic enlargement and eruption will soon make the diagnosis apparent.

Treatment.—Absolute rest in bed, a liquid diet and repeated doses of calomel may be employed to relieve the constipation. The fever may be controlled by the following mixture:

Tincture of aconite root ..... 3 drops
Spirits of nitrous ether .....½ ounce
Acetate of liquid ammonia, add sufficient to make 3 fluidounces.
A dessertspoonful every two hours for a child 4 years old.

PROTRACTED SIMPLE CONTINUED FEVER.

Definition and Cause.—It seems necessary for the present to continue this term for a feverish process of a longer duration than febricula—a fever of long duration that is not typhoid, nor influenza—lasting from two weeks to three months and without definite lesions may be put under this head. Cases of prolonged fever succeeding pneumonia and pleurisy which subsequently recover may well be ascribed to this disease.

Symptoms are, as will be readily understood from this explanation, slight chill or chilly feelings for the initial disturbance, followed in a few hours by headache, quickened pulse, rise in temperature and constipation. Very often in persons of sensitive stomachs there is a little nausea or vomiting for twelve or twenty-four hours, and again with those of sensitive skins there may be a slight eruption of roseola, or prickly-heat, as it is often called, especially about the loins and over the back. The fever may run high enough for the overheated blood to disturb the brain and produce some delirium, especially at night; but at the end of a period, varying in duration from twelve hours to ten days, the febrile symptoms usually subside without any further derangement of the system than a very copious and debilitating perspiration, or perhaps an outbreak of the vesicles of herpes, commonly denominated "cold sores," about the face or elsewhere. Such attacks as these cause much needless anxiety, needless at least in the Northern States, to both physicians and patients, the former dreading the onset of typhoid fever or other dangerous disease, and the latter suffering an agony of suspense from which, for a time, all the knowledge of Hippocrates or Æsculapius himself could not deliver them.

Treatment.—The patient in these puzzling cases should be kept in bed, and allowed only light and unstimulating liquid food. Cold applications may be made to the forehead and temples to relieve headache, and diaphoretics combined with anodynes, such as nitre and morphia, as already directed, to reduce fever and allay restlessness. Lumps of ice are useful and refreshing to the throat when swallowed and whilst there is constipation small doses of calomel repeated until there is a free bowel movement.

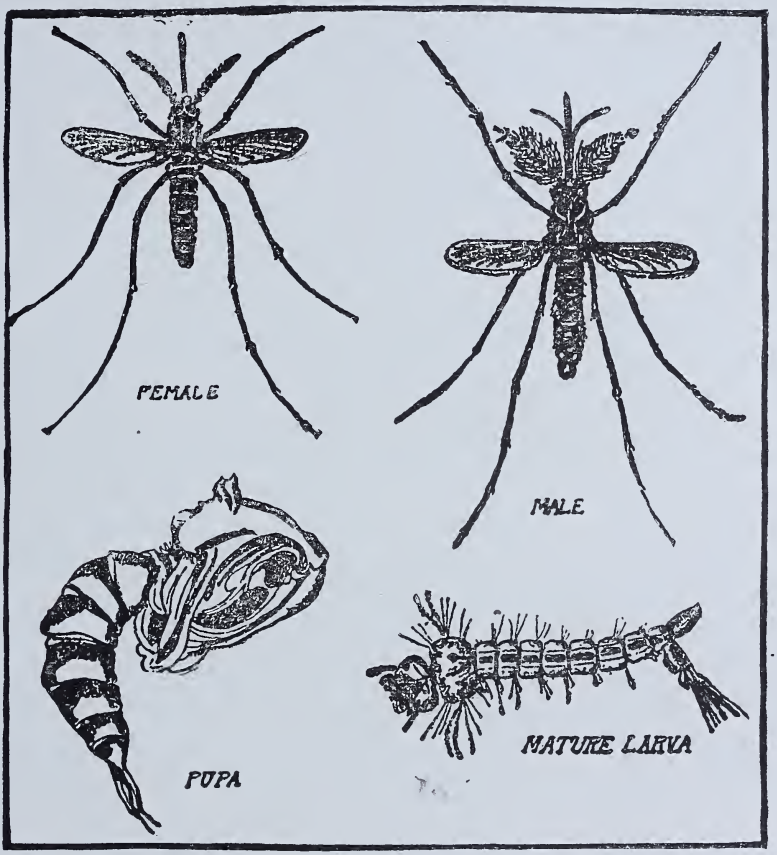
YELLOW FEVER.

These germs, in the course of ten to fourteen days, undergo a process of development and multiplication. At the end of the period of development the germs migrate to the biting organ of the mosquito, from where they are transmitted into the blood of a healthy person through the skin, when bitten. Each germ, in turn, when deposited in the blood vessel of the human body, multiplies and develops, and, liberating its toxin, spreads through the circulation and produces the yellow fever in it most pronounced form.

Yellow Fever, sometimes called Yellow Jack, Sailor's Fever, Black Vomit, Gibraltar Fever, etc., is a disease occurring in tropical and subtropical countries. Its cause is unknown, but science has proven that the

poison causing Yellow Fever is carried from one sufferer to another by the mosquito called the *Stegomyia fasciata.*

Yellow Fever is supposed to have been imported into the Western Hemisphere by the Spanish navagitors. It was first described as a disease in the middle of the seventeenth century, where it was discovered in



THE YELLOW FEVER MOSQUITO.

the Antilles. The disease affects seaport towns and maritime districts in tropical and subtropical countries. Epidemics occurred in the seaport cities of the United States in the nineteenth century. Philadelphia suffered from a disastrous epidemic during the end of the eighteenth century.

Yellow Fever always occurs in the summer and autumn months and ends upon the appearance of frost. Havana, Cuba, Vera Cruz, Mexico; Rio Janeiro, Brazil, and New Orleans during the nineteenth century, until the occupation of Cuba by the Americans, were the cities known as the spots in which Yellow Fever was usually present, and from which the disease spread to other seaport cities of tropical and subtropical countries and the United States.

The Mosquito as the Carrier of Yellow Fever.—Dr. Finlay, of Havana, in 1881 first called attention to the fact that the mosquito was associated with Yellow Fever, and about 1890 was the first to explain clearly the mosquito theory of the transmission of Yellow Fever, but he could not prove it at the time by experiment.

The American occupation of Cuba, however, brought into application in a practical way this theory of Dr. Finlay's. Thousands of cases of Yellow Fever occurred throughout the island and became a menace to the health and lives of our troops. This brought home to the United States Government the dangers and prevalence of Yellow Fever in so close a neighbor, and renewed efforts were made to prove that the mosquito carried the poison which caused Yellow Fever.

In 1900 Dr. Finlay had produced yellow fever in a man by allowing a mosquito to bite him two days after the insect had bitten a sufferer from Yellow Fever. This lead to experiments carried on by the U. S. Yellow Fever Commission, which confirmed, without doubt, that the mosquito (*Stegomyia fasciata*) spreads the Yellow Fever. This Commission had a mosquito-proof house built with a partition dividing it into two rooms. Into one room was placed a non-immune person in a bed and mosquitoes which had previously bitten Yellow Fever patients were liberated. They attacked and bit the volunteer, who had purposely exposed his arms and chest. This procedure was repeated three successive times. Five days after this experiment, this man developed Yellow Fever. On the evening that this first man exposed himself to the mosquito, two other men who never had Yellow Fever slept in the second room, which was screened and contained no mosquitoes, and they did not catch the disease from the man in the adjoining room; this experiment proving that the disease could not be caught by being near or in contact with a patient.

A second mosquito-proof house was constructed in which bedclothing and wearing apparel which had been soaked in the discharges from a sufferer from Yellow Fever, were placed, and this house was entered for twenty-one consecutive nights by two soldiers and a surgeon

who handled and shook the soiled articles. This experiment was repeated by three different sets of men, each remaining twenty-one nights. Not a man contracted Yellow Fever, nor was any the worse for the experiment. This experiment proved that Yellow Fever was not contagious and could not be caught by the handling of clothes, etc., from a patient who had Yellow Fever.

The absolute proof that Yellow Fever was carried by the mosquito was put to a practical test by Dr. Gorgas, of the U. S. Army, who in the cleaning of Havana destroyed every mosquito seen, cleared away all breeding places and screened all homes, hospitals and camps where Yellow Fever patients were confined. Thus Havana was made as free from Yellow Fever and as safe to live in as the healthiest city in the world.

It requires three to four days for a person to develop Yellow Fever after being bitten by a mosquito which has sucked the blood of a patient suffering from the disease. Experiments have proven that the mosquito cannot convey the disease to another until he has had the poison in his body for twelve days after biting a Yellow Fever patient. One attack of Yellow Fever renders the person immune to another attack—that is, they cannot have it twice.

Prevention.—The best course in Yellow Fever is to prevent its spread. Place the patient in a screened room or hospital. It is not necessary to keep him or her away from others with the disease or to exclude the family, as Yellow Fever is not contagious. Only be sure that all mosquitoes are killed and kept out of the room by screened doors and windows. In cases of an epidemic the local Board of Health will do well to call upon the State and Federal authorities to aid in fighting this dreaded disease. Every town or city in tropical or subtropical countries should do everything possible to destroy the mosquito and its breeding places. The following are the rules adopted by the United States Army for the protection of troops from the yellow fever mosquito:

"1st. The universal use of mosquito bars in all barracks and especially in all hospitals, and also in field service when practicable.

"2d. The destruction of the larvæ or young mosquitoes, commonly known as 'wiggletails,' by the use of petroleum on the water where they breed.

"The mosquito does not fly far and seeks shelter when the wind blows; so it is usually the case that each community breeds its own supply of mosquitoes in water barrels, fire buckets, post holes, old cans, cesspools or undrained puddles.

"An application of one ounce of kerosene to each fifteen square feet of water, twice a month, will destroy not only all the young but the adult females who come to lay their eggs. The water in cisterns or tanks is not affected for drinking or washing purposes by this application if only it is drawn from below and not dipped out.

"For pools or puddles of a somewhat permanent character draining or filling up is the best remedy."

Definition.—An acute infectious disease characterized by yellowness of the skin and accompanied in the severer cases by black vomit, suppression of the urine, with hemorrhage from the stomach, nose and mouth. It is almost peculiar to tropical climates and not apt to spread in temperatures below 72 degrees Fahrenheit. It is extremely fatal. It is not contagious. It can only be acquired by bite of the female mosquito known as *Stegomyia fasciata.*

Symptoms.—Yellow fever presents three well-defined stages. The first is characterized by intense pain in the head and back, injected eyes, rapid pulse and elevated temperature. This stage may last from twenty-four hours to six days—according to the severity of the attack, nausea and vomiting are present and become more intense on the second or third day. The bowels are usually constipated. As early as the first morning, according to Guiteras, the face is decidedly flushed, more so than in any other infectious disease at such an early period. The second stage is characterized by the following symptoms:

The Pulse.—One of the diagnostic signs is that with an ascending temperature, there will be a descending pulse. On the first day the pulse is rarely more than 100 or 110; on the second or third day while the temperature keeps up the pulse begins to fall and may become slower to the extent of twenty beats. On the evening of the third day there may be a temperature of 103 degrees and a pulse of 75; it may, during defervescence stage, go down as low as 30.

The Fever.—On the morning of the first day the temperature may vary from 103 degrees to 106 degrees; during the evening of the first day and the morning of the second day the temperature keeps about the same. There is a slight diurnal variation in the second and third days.

The Calm Stage.—Third stage, the remission or stage of calm, as it has been called, is succeeded by a febrile reaction, or secondary fever which lasts one, two or three days, and in favorable cases falls by a short lysis. On the other hand, in fatal cases the temperature rises rapidly, becomes higher than in the initial fever and death follows shortly. The

second stage is marked by depression of the nervous and muscular forces, and of the general and capillary circulations, slow and intermittent pulse, jaundice, urinary suppression, passive hemorrhages from the bowels, nose, gums, uterus and nearly all the organs lined with mucous membranes and, in cases of unusual severity, also from the eyes, ears and skin. Black vomit, delirium and coma generally terminate in death.

In more severe cases the symptoms resemble to a considerable extent those of relapsing fever, and it is impossible to foretell from any of these indications how serious these consequences may prove to be. In truth, these sequels constitute the most distinctive characteristics of yellow fever and comprise the "black vomit," so well known and dreaded as a fatal symptom. The black vomit is frequently preceded by the white vomit, as it is called, which is a clear acid liquid, and at this time some pain is usually felt on pressure over the pit of the stomach. The occurrence of this black vomit is well known, even among sailors to West Indian ports, as a fatal sign in yellow fever, although occasionally a patient recovers after this gloomy harbinger of death has manifested itself. The yellow-jaundiced hue of the skin, when well marked, indicates a severe form of the disease, but has by no means the terribly fatal import of the black vomit.

1. **Prognosis.**—There are epidemics in which all persons attacked are seriously ill or die. There are epidemics of medium intensity in which the progress of the disease is limited and the mortality low. Finally, there are mild epidemics in which nearly all the patients recover. The virulence of the epidemics seems to depend upon the month in which it is imported. The pathogenic bacillus increases in virulence in the months of May, June and July. On the other hand, the epidemics which are imported in the months of August, September and October are very mild, owing to the attenuation of the bacillus.

2. **The Individual Attacked.**—Should the patient prior to his attack have been addicted to the use of alcohol, should he be debilitated from overwork, sexual excesses or bad living, and lastly, if he be old, the prognosis is against his recovery. The younger, the healthier and stronger the patient the greater are his chances for recovery. When the fever reaches its maximum at the onset and defervescence is continuously noted at each visit, the disease is mild; even when the fever ranges between 103 and 104.5 degrees Fahrenheit during the first three days, with a remission of at least a degree in the morning and the exacerbations are less and less pronounced each night, the patient always gets well. When the fever

ranges between 104 and 105 degrees Fahrenheit, still with remissions of at least a degree, but with exacerbations above the degree of fever of the previous day, the disease is to be considered grave. The cases of recovery are more numerous than the fatal ones even here. But when the fever reaches 105 degrees Fahrenheit or above within the first twelve hours the disease is usually fatal, unless heroic treatment immediately produces a defervescence of two or three degrees. Copious urine is always a good augury, even should it contain five or ten per cent. of albumen.

Scanty Urine with twenty to twenty-five per cent. of albumen on the second day, accompanying a fever about 104 degrees, indicates great danger. When the urine froms a complete coagulum on being heated death is certain. When anuria lasts twelve hours death is absolutely certain.

Intense Jaundice on the third day, urine scanty and albuminous, with black vomit occurring at the same time, always results fatally.

Black Vomit is less grave in children and in young women than in adults, particularly those over forty years of age; the latter always die.

Profuse Bleeding of the gums coming before or at the same time as the black vomit indicates an almost desperate state. Should it, however, occur on the fourth day and the gums being sound, the prognosis is less gloomy.

Women having uterine hemorrhage on the fourth and fifth days with black vomit never recover.

Treatment.—There are two great principles to be carried out in the treatment of yellow fever:

1. To strengthen and sustain the organism by fortifying the nervous system, by arresting congestion and by increasing the blood pressure and diuresis.

2. To consume, destroy and eliminate the toxin.

First of Above.—The first of the above is met by means of cold sponging or cold baths, administered not in a routine way, but by taking the virulence of the disease and the degree of the fever as a guide.

Second of Above.—The second indication is met by putting the patient in a well aerated room, night and day, and making him drink in order to cleanse his blood and to dilute the toxin and eliminate them by way of the urine, two to four quarts of Vichy water in twenty-four hours.

It is during the first three days of the disease that the physician must act.

Absolute Rest.—Put the patient to bed, rest is essential and indis-

pensable, walking, moving or the least muscular effort always increases the fever, and consequently the disease.

Aeration of the Room.—The patient must be placed in the largest and best ventilated room in the house. Exposed to the rising sun if possible. Keep the windows open night and day; do not let patient be in a draught, but let the outside air enter and circulate freely.

Cleanliness.—The patient must be kept clean; should he be soiled by evacuation of the bowels or vomit, change the linen at once and plunge the soiled clothes in an antiseptic solution; cleanse the patient's teeth twice a day with cooking soda and warm water. Administer morning and night an enema containing a pint of warm water and a tablespoonful of sulphate of magnesia.

The Urine should be examined each day to see how the kidneys are acting.

Treatment of the Vomiting.—Let the patient eat small pieces of ice, but absolute rest for the stomach is the better plan.

Nourishment.—None should be given for the first seventy-two hours, after that milk every four hours. Starve your patient whether he be child or adult, unless the fever be below 102 degrees Fahrenheit. Vichy water in large quantities should be given from the onset of the disease.

Medicinal Treatment.—At the onset give one to three grains of calomel, depending on the age of the patient, but not enough to purge. In desperate cases enemas of strong black coffee to which is added two tablespoonfuls of brandy have been found beneficial.

BUBONIC PLAGUE.

Definition.—An acute infectious disease, which is identical with the pestilence of India and the black death of Europe in former ages, and is attended with buboes or boils of the lymphatic glands of the groins, as well as other glands and occasionally with carbuncles. It is very easily communicated by human intercourse and is probably the most fatal of all the eruptive fevers.

Cause.—The specific bacillus which causes this disease was discovered by Kitasato, and occurs in the blood and in the organs of the body. It obtains entrance through the digestive and respiratory tracts.

History.—The earliest positive accounts date from the second century of our era. From the great plague in the days of Justinian (sixth

century) to the middle of the seventeenth century epidemics of varying severity occurred in Europe. Although the inhabitants of the United States have hitherto been spared any visitation from the plague, yet, as the shipments of rags from Italian ports with marble, for which they are used as wrapping, is carried on quite extensively, germs of this terrible malady may at any time be imported and planted within our borders. In the last great outbreak of plague in Astrakhan, a province of southeastern Russia, the starting-point of the whole epidemic was, it is said, traced to a shawl brought by a Cossack returning from the war in Afghanistan, as part of his booty, and presented to his sweetheart. The girl wore the fatal gift for a few days, when she sickened with all the symptoms of plague and died. During the following four days the rest of her family, six in number, sickened and died. From these poor people the disease spread rapidly, and proved very fatal, devastating nineteen villages in that district. Its deadly march was only checked by a double cordon of soldiers being placed around the infected towns, and absolute non-intercourse, on the plan of the shot-gun quarantines of our Southern States, enforced.

Symptoms.—In the milder cases, patients are attacked with violent headache, transient shiverings, alternating with intense heat of skin, sometimes terminating in death from prostration. In the more severe form the persons affected are suddenly seized with palpitation of the heart, irregularity of the pulse, vomiting, difficulty of breathing, spitting of blood, and syncope or fainting. The face becomes pale, the expression apathetic, the eyes dull and the pupils dilated. The patients lie for three or four hours in a state of absolute prostration and then a violent accession of fever with delirium followed, in which the urine is suppressed and the bowels constipated. Dark purplish spots, from one-tenth of an inch to one inch in diameter, appear over the body, which exhale a peculiar odor somewhat resembling honey, and death is preceded by lethargy and collapse. The corpses become putrid in two or three hours after decease. Death sometimes occurs in twelve hours from the first onset.

The fever may reach 104 degrees or 106 degrees Fahrenheit, and the tongue becomes brown. The inguinal glands are most often affected, then in order, the axillary, the cervical and the popliteal. Carbuncles also develop in different parts of the skin, particularly on the legs, buttocks or back.

Treatment.—Free stimulation, nutritious food, as in the most adynamic forms of typhus and typhoid fever together with cool baths to

combat the fever, are the measures indicated. Antiseptic treatment of the abscesses should be practiced.

Preventive Measures.—In India, from 1896 to 1907, the number of cases of plague was 1,400,000, with 1,200,000 deaths. Owing to the filth and fanaticism of the people, neither curative nor preventive agencies were of much avail. It is evident that the greatest care is now demanded of every country to be watchful and to adopt all necessary measures to prevent a lodgment of the plague. Its introduction is due (1) to the arrival in a community of persons suffering from it, or who are in the incubative stage of the disease; and (2) through the instrumentality of rats, which are reagents of the plague.

Precautions as to Persons.—As to persons, precautions against the plague resolve themselves into measures of quarantine observance. Every vessel, its crew and all passengers arriving from infected ports should undergo most critical scrutiny. Temperatures should be taken on arrival, and efforts made to distinguish between the mild, or amulant, cases and those of the croupous, or pneumatic type. The history of each individual with a mild case should be carefully looked up. Examination should be made of the glandular regions, the groins, the axillæ, the neck, and if buboes are found they should be carefully distinguished from those due to venereal infection. For the detection of cases of the pneumatic type, the respiratory organs should be carefully examined, and the sputum subjected to microscopic or bacteriological tests to discover, if possible, the plague bacillus.

Incubation.—The period of incubation of the plague for quarantine purposes should be regarded as seven days, and individuals from ports or places where plague is known to prevail should be detained for a period to complete seven days from the last exposure to infection, and should be subjected to critical inspection twice a day.

Quarantine Against Rats.—To prevent the introduction of the disease through the agency of rats on vessels from infected ports, every part of the vessel should be disinfected by sulphur fumes for the destruction of the rodents, and their passage from vessel to shore should be prevented. The vessel should not be unloaded at a dock, but in mid-stream, by means of lighters. All rats found dead by the fumigation should be subjected to bacteriological examination, their bodies gathered and burned, and the places where they were found disinfected with a germicidal solution, or with boiling water. Fleas from the rats should be similarly guarded against, for they usually leave a dead rat, and thus help to spread the

plague germs. All masters of vessels, agents and consular officers would do well to subject their vessels to disinfection for the destruction of rats at intervals of, say, three months.

Procedure in Cities.—When the plague has made its appearance in a city, the authorities should promptly pass anti-plague ordinances regulating garbage disposal, and placing all unsanitary buildings and places in sanitary condition. All garbage and kitchen waste should be collected and removed in covered, rat-proof cans; rat runs and burrows should be destroyed or filled in with broken glass; house drains should be repaired; all nuisances should be abated; garbage should never be dumped in places accessible to rats, but should be burned; an active campaign against rats should be inaugurated, either by traps or by poisons, such as arsenic, phosphorus paste and carbonate of baryta. Rat poisons should be frequently changed, as well as the manner of displaying them. After the appearance of the plague in San Francisco in September, 1907, the campaign against rats resulted, in a few months, in the capture of 278,000 rats, and the destruction by poison of 500,000. Perhaps no other agency was so potential in ridding the city of the plague.

Plague in the House.—The house or dwelling in which plague appears should be vacated. The house should be disinfected and fumigated, poison spread and trapping instituted to rid the premises of rats. Cellars and basements should be made rat-proof to prevent their return. Patients suffering with plague should be removed to a rat-proof hospital for treatment, and those who have been in contact with the dwelling should be isolated in some sanitary place for a time sufficient to cover the period of incubation of the disease.

Serum Treatment.—While, as has been seen, the U. S. Bureau of Health relies chiefly on preventive measures for the extermination of bubonic plague, it by no means ignores the agencies which modern science places at its disposal for immunization from the disease or for dislodging it from the system. It has, therefore, experimented much with the prophylactic (preventive) fluid of Dr. Haffkine, by inoculating the system with it. In some cases it gave gratifying results, and in others proved disappointing. So also the antipest serum of Dr. Yersin has been tried and found to contain prophylactic qualities of a decided character, but the duration of the immunity offered is very uncertain; however, in the treatment of actual cases of plague this antipest serum has been found decidedly beneficial if used sufficiently early in the disease and in suffi-

ciently large doses. This serum is produced by the Pasteur Institute at Paris, France, and at the Bacteriological Institute at Lyon.

Outgoing Quarantine.—If the city in which the plague has made its appearance is a seaport, all outgoing vessels should be subjected to careful scrutiny, and should be thoroughly fumigated with sulphur before taking on cargo to insure the destruction of rats. Wharves should be rendered rat-proof; gangways should be fended and guarded day and night, and all articles of cargo attractive to rats should be kept in rat-proof enclosures. Rags intended for export from a plague-infested city should be thoroughly sterilized, or else destroyed entirely, for it is quite possible that they may contain the dressings used in the treatment of plague cases. They may also contain the dejecta of plague-infected rats.

Personal Protection Against Plague.—The following statement is made by Charles S. Braddock, Jr., M. D., of Haddonfield, N. J., late chief medical inspector of the Royal Siamese Government, in his "Notes on Bubonic Plague as Seen in Siam:"

"Personally in attending (plague) patients I always used plenty of coal oil on my shoes and stockings and on my leggings, as it has been shown that this kept the fleas away, a fact which was practically demonstrated in Bombay and Calcutta, where the coolie employees of the oil companies were found not to contract the disease which was raging all around them. The investigators in India found that on the death of a rat the infected fleas promptly left the dead rat, and if a non-infected rat was placed near them promptly attached themselves to him, and in a few days he was infected and died of plague. In the town of Petchaburi I traced the great and excessive death rate among the children to the fact that after the rats died the infected fleas took up their habitat on the pariah dogs, and, these being petted and fed by the children, the children suffered proportionately. As the people are Buddhist in religion, and will not destroy life, my application to have the dogs killed was not granted. One of the most effective measures to stop the disease after all disinfection and sanitation was accomplished was to wash all floors and furniture with crude coal oil, and sprinkle it with a watering pot in large quantities under the houses and over the ground in the vicinity."

SLEEPING SICKNESS.

(*Human Trypanosomiasis.*)

Sleeping sickness is a disease affecting human beings, which is caused by the parasite—Trypanosoma Gambiense, getting into the blood, due to the bite of the Tetse Fly. It is usually fatal.

Sleeping sickness has occurred for the last hundred years on the West coast of Africa, and the disease includes the country between the Gambia and Congo rivers.

In 1896 to 1901 this disease occurred in Uganda, Africa. It was evidently brought there by the natives who came from the Congo State where the disease prevailed. It was not recognized until 1901, when the cases became numerous.

Race.—This disease can develop in any race of people if exposed to the bite of the Tetse Fly.

Occupation.—Any work which leads a native or foreigner to spend much time on the shores of the rivers and lakes within the sleeping sickness territory, exposes himself to the disease. Native negroes contract sleeping sickness more than the whites, due to the fishermen, canoemen and other inhabitants being half naked and thus constantly bitten by the Tetse flies, 30 to 80 per cent. of them having the parasite in their blood.

Any person of any age or condition of health will develop sleeping sickness if bitten by a fly which has previously sucked the Trypanosoma from the blood of a sufferer from the disease.

Cause.—The sleeping sickness is due to a minute, wriggling, worm-like parasite, called the Trypanosoma Gambiense, named by Doctor Dutton. of England, in 1901, who was sent to investigate this disease which was causing the slow death of thousands of negroes in Africa. This parasite is only seen when blood is drawn from a vein or lymphatic gland and examined under the microscope. It is very difficult to discover and often requires several examinations of the blood before it can be seen. When the Trypanosoma first is injected beneath the skin by the bite of the fly it passes to the lymphatic system, where it is found in great numbers, causing a swelling of the lymph glands, then passing in small numbers into the general circulation.

These parasites only reproduce themselves within the human body. They do not pass out in the urine or stools, but only when the lymphatic duct blood fluids are withdrawn.

Sleeping sickness is not contagious, but is considered infectious. A delicate parasite which is incapable of living outside of the human body cannot be conveyed by drinking water, food, dust, etc., as other germs are.

Entry of Germ into the Human Body.—The Trypanosoma is conveyed from the sick to the well by the Tetse Fly (*Glossina Palpalis*), and it is the only species of fly known to harbor the parasite. Wherever sleeping sickness prevails, the Tetse Fly is correspondingly abundant upon the shores of the rivers, lakes, etc. This has been proven by taking flies which were caught in the sleeping sickness zones and alluring them to bite monkeys, the latter developing the symptoms of the sleeping sickness. The Tetse Fly cannot transmit the disease after three days have elapsed since biting a sufferer. The disease usually develops in a new case from eight to forty-eight hours after the fly has bitten a previous sufferer.

The Tetse Fly is only found along the shores of rivers and lakes, where there is forest, which consists of high trees, thick jungles and dense undergrowth. They are never seen on open sandy beaches backed by grass plains, nor in the grass of the grassy plains even though long and tangled.

Symptoms, First Stage.—After a person is bitten by a Tetse Fly, the trypanosoma is injected beneath the skin and then reaches the lymphatic and blood fluids of the body, wherein it multiplies. As far as is known they do not appear in the general circulation until twenty days have elapsed. The course of this stage of sleeping sickness is very slow and takes months and possibly years for the symptoms to develop. The average is between three months to three years or more. During this period the sufferer is attending to his ordinary work and feels well, but there is an enlargement of the glands of the back of the groins and armpits, which can be observed and felt as swellings bulging the skin in these parts of the body. If fluid is drawn from these swelling glands, after many careful searches the trypanosoma can be seen by the microscope. These glandular enlargements, with, of course, the finding of the parasites, and the history of a person having been in a sleeping sickness area, and bitten by the Tetse Fly are symptoms and facts which will prove that the patient is suffering from this disease.

Second Stage.—During this period the patient is apparently lazy and inclined to lay around and sleep during the day. He becomes more sleepy as the disease advances, the expression of the face is sad and apathetic, he is mentally dull, the eyes are dull and heavy, the eyelids droop.

The body is well nourished until late in the disease, if the patient is well fed. Headache is present, or there is complaint of dull pains in other parts of the body. The pulse is rapid and weak. The lymphatic glands are seen and on feeling, are about the size of a pea to that of a bean. There is never any eruption (rash) upon the skin. The patient walks with a weak gait, uncertain and shuffling. The hand grip is lost and the hands tremble when held out at right angles to the body. The tongue trembles when extended. The voice is mumbling, weak and monotonous. The fever during this time is from 101 to 102 degrees Frahenheit in the evening. These symptoms generally grow worse until after weeks or months the patient is unable to talk, walk, or feed himself. He is confined to bed, sleeps continually, is usually neglected and not fed by the ignorant relatives and friends, and becomes very thin. During the last two or three weeks the urine and stools pass without his knowledge and the temperature drops to 92 degrees Fahrenheit and he dies in a state of coma (stupor).

Treatment.—There is no known remedy which will kill the trypanosoma in the human body, nor any drug which will aid the patient in fighting the attack. It is a fatal disease and so far as is known every sufferer from sleeping sickness sooner or later dies from its effects. Iron, quinine and arsenic have been used as tonics, but with no results as to cure, simply prolonging life. Every known drug has been tried without success.

Prevention.—Sleeping sickness is difficult to prevent owing to its occurrence in a country which is inhabited by ignorant and superstitious savages, infested with the Tetse Fly, which alone spreads the disease. The fly cannot easily be destroyed owing to the dense jungles and forests which spread out from the shores of the lakes and rivers in the sleeping sickness areas. These cannot be burnt owing to their green and damp condition. If the natives were intelligent they might be urged to move from the infested region, but only the intelligent ones do this, the remainder would rather die than leave their shambles and their tribes. If removal does take place care must be taken to see that no species of Tetse Fly is present which might convey the disease to the new location.

Among intelligent people the disease is preventable by not living in a sleeping sickness area, or if compelled to live there by wearing clothing which covers the body completely and mosquito helmets for the face, and the screening of all doors and windows of houses, etc. Kill all flies seen indoors and remove all vegetation in the vicinity of the dwelling

and cultivate the ground if possible. Do not expose yourself in any way to the bite of the Tetse Fly.

HOOKWORM DISEASE.

The spread of hookworm disease is due chiefly to the lack of sanitary privies in the Southern homes and schools of the people in the villages, towns, etc. The depositing of bowel movements upon the soil and a poor sewage disposal is a means by which the parasite reaches the water supply. In some of the Southern colleges thirty per cent. of the students and as high as ninety-five per cent. of the pupils in the common schools showed the hookworm in the discharges from the bowels and the bladder, as proven when they were examined by the microscope. Those who had the disease were backward students as compared with the uninfected pupils, thus showing how the disease lowered their capacity for work and study.

If one child has a case of hookworm disease in the home or school, and the latter have unsanitary privies, every child in them is liable and usually does contract this dangerous, contagious disease.

Cause of Hookworm Disease.—It is caused by a small, round worm about half an inch long and as thick as a pin. The forms occurring in man do not develop to maturity in the lower animals. The special variety discovered in this country has been named the "Necator Americanus" or "American Murderer" by Dr. Stiles. Its color varies from a dead white to a dirty gray, sometimes red from the continued blood which it has sucked from its victim.

How the Parasite Gets Into the Body.—The worms do not multiply in the body, but the adult females deposit great numbers of eggs in the small bowel, from a few hundred to three or four thousand every day, which are carried out with the normal bowel movement. The eggs hatch out the young worms called larvæ in the course of twenty-four hours. Within a week the tiny organism has shed its skin twice, like a snake does. It lives in this cast-off skin, but takes no food after the first few days following its escape from the eggs. After shedding its skin, the young worm is capable of entering the human body of another person when passed out in the bowel movement of the person in which it is developed. It may enter the human body in one of three ways. First, it may be swallowed with contaminated food, milk or water. Secondly, it gets into the body by boring through the skin. Third, the eggs, larvæ or young worms may be carried on the legs of flies.

In boring through the skin the young worms produce the condition known as "dew poison" or "ground itch" or "toe itch," which is usually the first symptom of hookworm disease. The "dew poison" occurs mostly about the feet and ankles, but in miners or farmers who work in infected or polluted ground, and sometimes in children, the "dew poison" appears in the hands and arms. After boring through the skin, the worm enters the blood stream and passes through the heart to the lungs, makes its way up to the windpipe or is coughed up and swallowed, and after its passage down the gullet to the stomach finally enters the small bowel. Having

HOOKWORMS.—A, female; B, male.

reached the bowel where it elects to remain, the tiny worm sheds its skin twice more, becomes fully developed and mates. The worms are provided with strong jaws and a hollow tooth somewhat like a snake. The worm hooks itself to the wall of the bowel by its strong jaws and sucks the blood of the child or adult in which it lives. Thus it wounds the wall of the bowel, sucks the red blood and weakens the patient. In addition the worm mixes the blood, after digesting it with its own poisonous bowel matter and injects or squirts it through this hollow tooth into the body of the

patient. Thus the hookworm is first—a blood destroyer; and second—a blood poisoner.

Symptoms.—If a child is infected with the parasite before puberty (adultage), the physical and mental condition is retarded. A boy or girl sixteen may present the body and mind of one of eight or ten years of age, and young men and women of twenty may appear to be not more than twelve or fifteen. The skin is pale, perspiration or sweat absent, cuts or bruises heal slowly. In the early stages of the disease "ground itch," "dew itch" or "toe itch" is often found upon the feet, ankles or hands.

The hair may be normally developed upon the head, but on other parts of the body where it ought to be it is generally absent or scarce. The face, feet, ankles, and in extreme cases the entire body, may be swollen. This swelling disappears rapidly after treatment. Body weight is reduced. The chest is thin, ribs prominent, the shoulder-blades stand out upon the back and the patient appears "round-shouldered." The expression of the patient is anxious or very stupid. The appetite may be light or it may be ravenous, the child being unable to obtain enough food at an ordinary meal to satisfy its appetite. The patients often develop a desire for abnormal articles of food and this is why sufferers of hookworm disease are called "dirt eaters:" They crave and eat lemons, pickles, salt, pepper, sour milk, chalk, clay, ashes, tobacco, mortar, plaster, sand, gravel, sticks, decayed wood, paper and cloth. Nausea and vomiting are frequent and there is tendency to heartburn and pain over the pit of the stomach.

The blood is impoverished, the patient suffering from thin blood or anæmia as a result of the red cells of the blood being destroyed and the blood poisoned by the worms which suck it out and at the same time inject into it the poison from their bowel movements.

The only sure way of diagnosing hookworm disease is to examine the bowel movements of the patient under the microscope and find the eggs, or to see the tiny worms, the size of an ordinary pin with the naked eye, which appear before or after treatment in the stools.

Hookworm disease is termed the "lazy disease." This is due to the sufferers' muscles being very soft and weak. The shirking of work and study is not due to laziness, but is nothing more or less than weakness or weariness because the hookworm is sucking their blood. They must be considered ill and treated as such.

Treatment.—In curing hookworm disease, we do not treat the patient, but the worms. The remedies used either kill or cause the worm to loosen its hold on the wall of the small bowel. The treatment must always

be given under the care of a physician. It is simple and usually very effective if directions are properly followed. It can be given to those who cannot afford to stay away from business or work by having them take the treatment on Saturday evening or Sunday morning. The best treatment is to give the drug thymol in capsule form.

The bowels must be thoroughly emptied before the thymol is taken, so that all mucous and undigested food which surrounds the worm is removed, thus giving the thymol an opportunity to come in direct contact with the hookworm to properly affect a cure.

Directions to Patient.—At bedtime for two nights before taking the capsules, take an ordinary dose of epsom salts and during the intervening day between the nightly doses of salts, eat only liquid foods, such as milk and soups. On the second morning after taking the first dose of salts, do not get up, and eat nothing at all, and at 6 A. M. take one-half of all the capsules of thymol and at 8 A. M. the remaining half. The number of capsules to be taken and the amount of each one depends upon the age (not apparent age) of the patient. This must be judged by the physician in attendance. At ten o'clock the same day take a dose of epsom salts, but do not take oil, fats or alcohol while taking the capsules, as these substances render the thymol absorbable by the digestive tract and poisonous symptoms occur. After the bowels have moved thoroughly following the ten o'clock dose of salts, the patient may eat an ordinary meal, and it will not be necessary to stay in bed. This treatment is recommended by Dr. Lock, Inspector of the State Board of Health of Kentucky.

The Size of the Total Dose of Thymol.—

Under 5 years old	$7\frac{1}{2}$ grains.
From 5 to 9 years old	15 grains.
From 10 to 14 years old	30 grains.
From 15 to 19 years old	40 grains.
From 20 to 59 years old	60 grains.
Above 60 years old	30 to 45 grains.

(Recommended by Dr. Stiles.)

It has been proven that after one treatment of thymol, as recommended by Dr. Lock and Dr. Stiles, ninety per cent. of the cases are cured. The bowel movements must be examined under the microscope two weeks after each treatment for the purpose of finding the pin-sized worms. If present, the thymol treatment must be repeated until all worms are absent from the bowel movements.

The anæmia and debility of all sufferers from the hookworm disease

will soon disappear when the worms are destroyed and the food the patient takes is absorbed and used to make blood by the system, instead of being destroyed and poisoned by the hookworm. However, iron tonics and nourishing food must be given to build up the blood and aid recovery.

Prevention of Hookworm Disease.—Board of Health, state, county and city, in the Southern States. are spending thousands of dollars to wipe out the hookworm. It has been discovered that the worm develops as a result of "soil pollution." Not only can it be prevented, but at the same time the methods used are preventive of typhoid fever and other germ diseases, whose poisonous elements are carried in the bowels and urine from the infected person to the soil and water.

Hookworm disease is spread as a result of the carelessness of persons who dispose of their bowel matter upon the soil and by the use of unsanitary privies and toilets which drain upon the soil or a water supply.

Shade and moisture are necessary for the eggs and larvæ of the hookworm to hatch and develop. Therefore, those who are infected with hookworm disease, and use the shaded spots where no privies are, to pollute the soil, are depositing and spreading their disease by their carelessness; as shady spots are usually moist and make the best place for the hookworm to develop.

In some States even of this country many homes in villages outside of the towns and cities which have a sewage system and schoolhouses, etc., have no privies. (Think of it in the twentieth century in America.) Only the wealthier families have an occasional toilet on the premises, and these are absolutely unsanitary and are built apparently to only shield the user.. Is it any wonder that hookworm disease, typhoid fever, cholera infantum and dysentery thrive amid such surroundings?

Hookworm disease can be prevented from spreading by first curing the present sufferers with the thymol treatment, the building of sewage systems in the larger towns and villages with sanitary toilets, the building of properly constructed fly-proof privies on farms, in schoolhouses, etc., the removal of all privies from a location where the waste matter can drain on to the soil which can be washed by rain or melting snow into a spring, creek, river or any other water supply of a house, camp, farm, dairy, etc.

Children or adults in a region where hookworm disease is prevalent must wear shoes to protect their feet and ankles from the larvæ upon the skin, as they will bore through and in this way get into the system. Boil all water and milk and cook vegetables.

In the Southern States particularly, and others also, any child or adult who is apparently "lazy" and always tired with a puffy abdomen, tremendous appetite, swollen eyes, and loss of weight with anæmia, must be taken to a physician or public dispensary to ascertain whether or not he is suffering from the hookworm disease, and if a sufferer, receive treatment at once. Kill all flies about, screen doors and windows and construct a sanitary privy.

PELLAGRA.

Pellagra is a disease the cause of which is not definitely known. So far scientific investigation has not disclosed any germ as the cause, though some physicians believe it is an infectious disease and can be caught from a new case appearing in a community for the first time. It has been proven though that it is the result of a poison which exists in spoiled maize, Indian corn or corn products. This theory was first explained by Ballardini, an Italian physician, in 1844, his theory being that the maize underwent a change by reason of the growth of a fungi on the grain, which acted as a poison to the system, and could be recognized in the grain as a greenish color. Another theory put forth by Dr. Scanlon, of the London School of Tropical Medicine, is that the "black-fly" or "sand-fly" (*simulium repatans*) causes it. Still another theory is that it is due to the stable-fly (*Stomonys calcitrans*); the mosquito is also considered as a carrier of pellagra. Others claim that no matter what the definite cause is, it is a disease which is being imported into this country by the hordes of immigrants from Italy.

Whatever its cause, pellagra is a serious disease and has been a national scourge in Italy and other European countries for more than a hundred years. An epidemic occurred in Italy in 1907 during which 100,000 cases occurred and at least 50,000 cases in Roumania. Thus it can be seen how prevalent the disease may become during an epidemic and cause great mortality as well as loss of health and money to citizens and the State. Several cases have occurred in women who have washed the clothes of patients suffering from this disease, due to a poison being thrown off from the glands of the armpits which has been collected upon the clothing and may have caused the disease in the laundresses, showing that the disease is apparently infectious.

People who eat spoiled maize or Indian corn have developed pellagra and from our present knowledge of the disease it would seem that this is the main cause of the symptoms.

The early symptoms of pellagra are marked enough to recognize the disease, but in cases seen where the patient has had it for some time, unrecognized, it is difficult to make the diagnosis. The first symptom compained of is an inability to walk straight. Persons can't step where they want to. They have an inclination to run forward, also a sudden contraction of the muscles of the back which may almost throw the sufferer out of bed. Later on a reddish rash appears, and this is characteristic of pellagra in that it appears upon the same spot on both hands, arms or sides of the chest, etc. Another marked symptom is the salty taste in the mouth, the mouth also is inflamed, patient also complains of great wearines and expresses it as "leg tire." The patient is dull, cannot think quickly and dizziness is complained of. Pain occurs along the spinal column.

Prevention of Pellagra.—Avoid eating corn bread or meal unless sure that the corn is fresh and has not undergone "heating." Avoid alcoholic drinks. All flies and mosquitoes must be killed, as they may carry the poison which causes the disease, and their breeding places must be removed. It is not necessary to isolate a patient from his family, but the ordinary precautions of disinfecting the hands after handling the patients, his or her clothes, etc., should be followed. A physician should be summoned, as the treatment requires such skillful handling that no layman can cure himself with any known remedy. A sufferer can only recover by following a course mapped by his physician, as to diet, mode of living and medicines to be taken.

Pellagra and Corn.—The scientists of Italy and Roumania where pellagra has existed for upwards of one hundred years, state that when corn is harvested, while the ear is yet moist, because of not having been given time to dry out in the field, it is particularly apt to mildew in the barn. The same thing is true of even matured corn in particularly moist climates. When corn that is damp from any cause is placed in tight barns or cars for shipping, it is likely to mold. This mold is extremely dangerous, regardless of what may be the cause of its development. The presence of the mold may be determined by any individual, for it is none other than the mustiness that we have all smelled in corn upon occasion. That musty odor is the warning of the presence of a danger that cannot be overestimated.

MALARIAL FEVERS.

Under this group are included infectious diseases caused by a parasite plasmodia, which are spread from one person to another by the bite of the mosquito (*anopheles maculopennis*) which contains the parasite in its body. Malarial fevers are spoken of by the public as ague, swamp fever, chills and fever, etc. The malarial fevers occur in periodic attacks and are classified as: (1) regularly intermittent periodic fever of the tertian or quarter type; (2) irregular fever of remittent or continued type; (3) chronic malaria or a condition resulting from repeated attacks of malaria with anæmia and enlargement of the spleen.

Etiology.—Influences predisposing to the spread of the disease. Conditions which favor the development of the mosquito as heat and moisture found in stagnant pools, lakes, rivers or any still body of water. Areas of special prevalence are found in tropical and subtropical countries—Panama, Central America, India, Northern Africa, especially along the coast and river basins. Malaria is prevalent along the shores of rivers in the Southern States of the United States, particularly along the Gulf States. Malarial fevers have almost disappeared from New England and New York. It is very infrequent in eastern Pennsylvania, New Jersey and Maryland. The Northwestern States, the Pacific coast, and the regions north of the St. Lawrence River are practically free from malaria.

Season.—In the tropics malarial fevers are most prevalent during the rainy season. In temperate climates a few cases occur in the spring, the greater number of cases occur in the early autumn.

Locality.—Malarial fevers occur more in the country or outlying districts of a large city. This is due to the fact that the *anopheles maculopennis,* the only species of mosquito which conveys the parasite, breed in small, shallow pools and stagnant waters. The *culcinioc,* the mosquito seen about the home in suburbs or cities free from marsh lands, etc., do not carry the parasite of malaria. They prefer human habitations and deposit their eggs in still water which is allowed to stand in rainpipes roof gutters, cesspools, barrels and other containers about the premises. Hence malaria is more prevalent outside of cities.

The cause of malarial fevers was discovered in 1880 by Doctor Laveran, a French army surgeon in Algiers. He examined the blood of patients suffering from chills and fever and found the parasite which caused the symptoms was present in every case. This tiny parasite has

been termed the Plasmodium Malaria. It has been discovered and proven that the parasites causing malarial fever have a definite course and development in the blood of man and the body of the mosquito.

The Parasite in Man.—Three species of parasites are recognized as causing the different types of fevers in sufferers from malaria: (a) the tertian is caused by the Plasmodium Vivax; (b) the quartan by the Plasmodium Malaria; (c) the estivo-autumnal (Perincenis) by the Plasmodium Immaculatum.

The Tertian Parasite (*Plasmodium Vivax*).—This species when injected into the blood of a person by the bite of a mosquito—the *anopheles maculopennis*—causes a fever which occurs every forty-eight hours. The fever results from the parasite undergoing a development in the red cells of the blood, in which new parasites are developed at the same time, destroying the cells, then they attack fresh cells, at which times the fever develops and they repeat this until treatment is instituted. But the tertian parasite never causes chills or fever until its period of development is completed—forty-eight hours.

The Quartan Type (*Plasmodium Malaria*).—This species also carried by the mosquito is the cause of quartan fever. Its cycle of development in the red blood cells of man is seventy-two hours, when the new parasites are liberated and attack fresh blood cells, thus causing chills and fever once every seventy-two hours.

The Estivo-Autumnal Parasite (*Plasmodium Immaculatum*).—This parasite is the cause of estivo-autumnal fever (*Perincenis*), which is the most malignant type of malarial fever. It is conveyed by the bite of the mosquito—*anopheles maculopennis.* Its development takes place in the red cells of the blood in the liver, spleen and bone-marrow, and usually requires forty-eight hours to develop. This parasite will not cause a great deal of fever, but a continuous one which lasts for some time and goes up very high and remains up until recovery occurs, when it drops suddenly.

The parasites of tertian fevers can only be seen by withdrawing the blood from a finger or lobe of the ear and examining it under the microscope. The estivo-autumnal parasite is not often found in the peripheral blood of the body. Each parasite causes its own type of fever and no other.

The Parasite in the Mosquito.—The common species of mosquito which carries and spreads malaria is the *anopheles maculopennis.* There are many species, but wherever malaria is found the *anopheles* is always in the neighborhood. The *anopheles* cannot convey malaria unless it has sucked the blood of a patient suffering from malaria. Its bite alone does

not cause the disease unless it has the parasite in its body, and the parasite does not develop in cold climates. Thus the *anopheles* can live in regions not malarious and still be harmless, but should one of this species bite a sufferer of malaria, who recently arrived and had the parasite in his blood, then the mosquito could spread the disease by biting another person.

Persons living in malarious countries should be familiar with the habits and appearance of the mosquitoes seen within the house or about the premises. The *culex* or ordinary mosquito which is not a carrier of malaria can be recognized by its position from the *anopheles maculopennis.* The former rests upon the ceiling or wall with its posterior pair of legs turned up over its back, and the body, if not dragged down by the weight of blood, is nearly parallel with the wall. Its wings show no special marking. The *anopheles maculopennis,* when resting, places the posterior pair of legs upon the wall or ceiling or allows them to hang down, and the body is held at an angle of 45 degrees with the surface upon which it rests. The wings of this species show distinct markings.

Part Played by Mosquito in Spreading Malaria.—Let us take, for example, a man suffering from the tertian type of malarial fever. In forty-eight hours the malaria parasite has undergone a development, sexual and non-sexual, in the man's red blood cells, thus forming new parasites. The non-sexual developments have formed spores, these spores find their way into a red cell and begin the sexual development, which progresses until the cell develops into a different shape, called Gametocyte, now the mosquito bites this patient and takes into his stomach these Gametocytes, which are at this time of both sexes—male, the Microgamiti, female, Macrogamet. The cells reproduced by the Macrogameti penetrating the body of the Macrogamet, a single cell resulting—called the Zygote, the latter passes into the wall of the stomach of the mosquito, when it develops in an oöcyst containing sporeblasts which develop into sporozoites. The mature oöcyst bursts and these accumulated sporozoites reaching the circulation of the mosquito are carried to the salivary glands, and when the mosquito bites a fresh victim, he injects the young sporozoites into his blood through his proboscis as he sucks the blood, and the development of the parasite is repeated, as in the first patient.

Symptoms.—Malaria usually develops in a person in from a few days to two weeks after being bitten by a mosquito. The symptoms of the tertian and quartan types are practically the same, and are spoken of as the paroxysm.

The paroxysm is known as the chill or "ague fit," and is described under three stages: cold, hot and sweating.

Cold Stage.—During this period the patient at first complains of loss of energy, yawning, pain in the pit of the stomach, sometimes nausea and vomiting with headache. Shivering commences which develops into a chill. The teeth chatter, there is violent shaking of the whole body, and distressing sensations of extreme cold. The face is blue, the body is covered with goose-flesh, the temperature of the surface of the skin is subnormal. This stage lasts from fifteen minutes to an hour or more. The danger of the attack lies in how long the cold stage has progressed.

Hot Stage.—The cold sensations are replaced by those of heat. The face becomes flushed and the fever is high, 101 to 104 degrees Fahrenheit, the pulse is free and strong, headache is present and delirium occurs in some cases. The patient complains of urgent thirst and is distressed by the sensations of extreme heat which he feels within the body. The duration of this stage usually lasts from thirty minutes to three or four hours.

Sweating Stage.—Perspiration appears upon the forehead and face, later the entire body is drenched. The duration of this stage is variable. The patient finally falls into a sleep from which he awakes, very weak but refreshed.

The entire paroxysm may last from two to six hours depending upon the severity of the attack. Between the paroxysms the patient feels well and considers himself in normal health. The paroxysms are due to the breaking down of the red cells and the liberation of a poison from the parasites, produced during the maturity of the parasites in the red blood cells of the sufferer; also the liberation of the new parasites (Sporozoites). A paroxysm which occurs every forty-eight hours in malaria is due to the presence in the blood of the tertian parasite, and it is called tertian fever. A paroxysm occurring every seventy-two hours is due to the presence in the blood of the quartan parasite; then we speak of this as quartan fever. In some cases of malaria, a paroxysm occurs every day (quotidian fever). Then it is due to the fact that two groups of parasites are present, which undergo segmentation on alternate days. This is spoken of as a double tertian period.

If two groups of the quartan parasite are present in the blood, the paroxysms occur every seventy-two hours on alternate days, thus there will be two days of chills, fever and sweats, with a day in between, free from an attack. This is spoken of as a double quartan; if three groups

are present there will be a daily attack (Quotidian Fever), this is called a triple quartan.

The Estivo-Autumnal, or Perincenis Malarial Fever.—This type of fever prevails in southern Italy and Russia, tropical countries and the Gulf section of the United States. It usually develops in the last part of the summer or early autumn. It is characterized by irregularity due to the parasites in the blood, which have a cycle of development of about forty-eight hours, being in numbers or groups and does not mature upon certain definite days. The intensity is due to the dangerous nature of the poison produced by the parasite at the time of the sporulation of the numerous groups.

Symptoms.—The sufferer from the estivo-autumnal type of malarial fever does not have a paroxysm occurring at regular intervals, but suffers from a high fever, which begins and stays high until recovery. There may be no chills but fever and sweats are symptoms. The face is flushed, severe headache is present, the pulse is bounding and enlargement of the spleen occurs. Jaundice of the skin is seen. This fever may be very mild, or the patient may suffer from a severe form. The most dangerous types of estivo-autumnal fever are grouped under the Perincenis fevers. These are characterized by grave symptoms and unless properly treated and protected against reinfection may result in death. These types of perincenis malaria are called (1) Algid form, (2) comatose form, (3) hemorrhagic form.

Malarial Cachenia or Chronic Malaria.—This is a condition of health occurring in patients who have had and been exposed to malaria numbers of times and did not receive proper treatment and protection from the bite of the mosquito which carries the parasite. It is characterized by an anæmia (thinning of the blood), with enlargement of the spleen. The patients are very thin and lose weight, the complexion is muddy with brown spots in the skin. Shortness of breath occurs upon slight exertion, and the ankles are usually swollen. The spleen becomes so large that it resembles a tumor known in the Southern states as "Ague Cake." Vomiting of blood may occur and is usually fatal if a symptom.

Treatment.—In the tertian and quartan types quinine is given in 15 to 30 grain doses (preferably in solution), at the time the temperature declines and repeated if necessary upon the following day. The treatment should be continued for at least a month, but the dose must be gradually reduced. Keep this up however if the paroxysms occur or the parasite is seen in the blood of a patient when examined under a microscope.

In the estivo-autumnal type quinine should be given in five-grain doses every four hours until the active symptoms have cleared up, then five grains every six hours for the next three days. During the following week the patient must receive 15 grains once a day every other day, and for two months, following give 15 grains every sixth day until all danger is passed. In this way the disease can be cured. Also be sure that the patient is protected from reinfection or moves away from the malarious country until cured. Do not stop quinine treatment until parasites cannot be found in blood, and chills and fever and enlarged spleen, etc., are absent.

Treatment of Malarial Cachenia, or Chronic Malaria.—Quinine, iron, arsenic and various tonics have been used, but the best treatment is to remove to a non-malarious country with a high altitude and avoid living again in a malarious country. Sufferers from malarial fevers will recover more quickly if confined to bed. Quinine acts in curing malaria by directly destroying the malarial parasite.

Prevention of Malarial Fevers.—As malaria parasites are carried from one person to another by the mosquito (Anopheles Maculopennis) its spread can be prevented by destroying the mosquito, screening all doors and windows, etc., wearing clothing which protects the body completely, wearing a mosquito helmet over the head and face, or smearing oil of citronella over the face and hands at intervals.

If choosing a site for a house or camp, or any building, high, dry ground should be selected, away from all still bodies of water, if possible drain all stagnant pools, etc., fill in with earth water which cannot be drained and prevent mosquitoes from laying their eggs in these hiding places. Kerosene freely used about the premises upon any still body of water will prevent the development of the anopheles and thus destroy the common carrier of malaria.

Persons living or traveling and exposed to malaria can oftentimes protect themselves from contracting the disease, even though exposed to the bites of the mosquito, by taking five to ten grains of quinine once a day, two or three days a week. Of course some people contract the disease regardless of this precaution. See Part I of Book II (Preventive Medicine) for further habits of the mosquito and methods of destruction.

AGUE OR INTERMITTENT FEVER.

Ague or intermittent fever is invariably prevalent in swampy countries. In olden times it was attributed to the insects rising at night-time from the swampy ground, but now it is known that it is obtained only by means of the mosquito, which finds its best breeding place in swamps and still waters. It is to be observed that it is only the female mosquito which is able to impregnate malaria in the human victim.

Symptoms.—Characterized by three distinct stages of fever, chill and sweat. The paroxysm is usually preceded by a feeling of uneasiness and discomfort, sometimes langour and yawning, which forewarns the patient of its coming.

1. **The Chill or Cold Stage.**—Begins gradually; first there is a creep, then another, a little more severe, then another, each growing in severity until the teeth chatter and the body shakes violently. Not only does the patient look cold, but a surface thermometer will indicate a reduction of the skin temperature. The rectal temperature during the chill may be greatly increased. It lasts from fifteen minutes to an hour.

2. **The Hot Stage.**—Next comes the hot stage, in which all the symptoms of fever are manifested, comprising headache, nausea or vomiting, heat of skin, which may attain an elevation of 105 degrees, full, strong, rapid pulse and occasionally delirium lasting from a half hour to four hours. After this follows the sweating stage, during which profuse perspiration takes place and the temperature is reduced, as a consequence, nearly or quite to the natural standard. The paroxysms, thus constituted, generally recur with considerable regularity, but may vary a good deal in different cases in regard to the interval between each paroxysm.

Varieties of Ague.—The varieties of ague designated in accordance with this difference are, first, the quotidian or daily ague, in which the fit comes on usually at the same hour every day; second, the tertian ague, the most common form, when the paroxysm returns every forty-eight hours whilst the disease continues; third, the quartan, where the fit occurs every seventy-two hours, or on every fourth day; and fourth, the irregular ague, in which the fits are not distinctly periodical. Under this head is included the kind of periodical neuralgia affecting the forehead, and hence denominated brow-ague. In the quotidian form the paroxysm is apt to be

the most prolonged and may last for sixteen hours out of the twenty-four, leaving of course only eight hours between its termination and the commencement of a new chill; in the tertian form, the fit is less protracted, lasting on an average about ten hours; and in the quartan it is still shorter, having an average duration of only six hours. In a fit of tertian ague continuing ten hours, we may expect to find the chill lasting from half an hour to an hour, the febrile stage, during which the patient often declares he feels as though he were burning up, extending over from three to five hours and the sweating stage occupying the remainder of the time.

Complications.—The most common secondary affection which occurs in the course of intermittent fever, and appears to be directly dependent upon it, is the chronic enlargement of the spleen, called "ague-cake." During the cold stage of the fit, it is probable that the spleen is always more or less distended with blood, which, being driven from the surface of the body whilst the chill lasts, finds its way to the internal organs and especially the spleen, in unusual quantity. Such congestion, if frequently repeated, seems to lead, in a majority of cases, to a real increase in amount of the structure of the spleen, and consequent enlargement of the organ.

The Ague-Cake.—The "ague-cake," when fully developed, may attain a magnitude of a foot or more in length by ten inches in breadth, and even when much smaller than this may be felt as a hard, painful and movable tumor, on the left side of the abdomen, a few inches below the heart. Such increase in size of the spleen generally indicates a rather profound impression of the malarial poison upon the system, and renders the prospect of speedy cure far less hopeful.

Lack of Blood.—Another serious complication of prolonged ague is the intense anemia, which so many persons who suffer from malarial poisoning often exhibit to a marked degree. The absence of the natural supply of good, rich, red blood gives to the skin, and especially that of the face, a dull, yellowish tint, which in malarious regions is displayed by most of the inhabitants, even the children exhibiting a pallid sallowness pitiful to behold. There is also a peculiar dejected, woe-begone expression of countenance, which is almost characteristic of malarial poisoning, and feelings of muscular weakness and fatigue on the slightest exertion are very common.

Diagnosis.—The diagnosis of ague is seldom difficult after the first paroxysm, as the regular recurrence at the same hour of the day is a feature which is so characteristic that it has given the name of "periodical fevers" to the febrile affections caused by malaria. At the first onset, it

is impossible to distinguish the chill from the initial symptom of a great number of diseases, but a microscopical examination of the blood will quickly decide. The plasmodium of malaria is found in the blood during the paroxysms.

Treatment.—In the medical treatment of all the periodical fevers, we fortunately possess a specific of wonderful power in quinine and the other alkaloids of Peruvian bark, which have a direct control over the malarial poison, by checking the development of the *bacillus malariæ,* which has been already referred to as being the cause of ague.

Quinine Treatment.—It is the custom to prepare the system for the administration of quinine, by the purgative action of full doses of blue-pill or other active cathartic. Give quinine in sufficient doses, during the sweating stage, to produce the slight deafness and ringing in the ears which mark the occurrence of cinchonism, as it is denominated. As a general rule, it is quite possible to do this before the time for another paroxysm, even with an attack of intermittent fever of the quotidian type. The antiperiodic must, however, in order to effect a cure, be continued in full doses of from ten to thirty grains daily, for three or four days, then reduced to half or one-third this quantity for a few days, and so persevered in for three weeks.

Preventing Fever Recurrence.—For the purpose of counteracting the tendency which intermittent fever possesses of recurring in its original violence at intervals of exactly one week, it is advisable to take the full dose of from ten to thirty grains, or whatever amount has been found to produce slight buzzing in the ears, on the sixth and seventh, the thirteenth and fourteenth, and the twentieth and twenty-first days from that on which the last chill was experienced. In this way not only the periodicity of single ague-fits, but also the periodicity of groups of the intermittent fever paroxysms, appears to be most effectually extinguished.

An East Indian Cure.—In case quinine fails or is not tolerated, other alkaloids of Peruvian bark, and preparations of the bark itself, should be fairly tried. A famous East Indian mixture for the cure of ague is Warburg's tincture, and it may be resorted to when ill-success with other forms has been met with.

Use of Peruvian Bark.—The alkaloids of Peruvian bark are, as a rule, much more efficacious in solution with some mineral acid, such as the dilute sulphuric acid.

Other Treatments.—Where for any reason Peruvian bark and its preparations fail to cure ague, the best substitute, although a far inferior

one, is probably arsenic, particularly in the form of Fowler's solution, administered in quantities of five drops thrice daily, and formerly well known under the name of the tasteless ague-drop. For the cold stage, wrap the patient up well in blankets and apply hot-water bags, besides giving hot drinks. For the fever, cool sponging will relieve the patient.

Diet.—No particular care of the diet is requisite in intermittent fever, except to counteract as far as possible the tendency to anemia and general debility, by a liberal supply of the most nutritious food which the digestive powers are able to assimilate. In like manner, as the patient is not confined to bed, directions about nursing are unnecessary.

Prevention of Ague.—The remedy to be used in preventing an attack of malarial poisoning, when temporary residence in a fever and ague district is unavoidable, is quinine used internally, as already suggested, in doses of six or eight grains daily.

THE MORE IRREGULAR, REMITTENT OR CONTINUED FEVERS.

Place and Seasons.—This type of fever occurs in temperate climates, chiefly in the later summer and fall; therefore it is sometimes called estivo-autumnal fever. The severer forms of it prevail in the Southern States, where it is known as the bilious remittent fever. The entire group of cases included under the term remittent fever are bilious, remittent and typho-malarial fevers.

Symptoms.—These, as to be expected, are often irregular. In some instances there may be regular intermittent fever, occuring at uncertain intervals of from twenty-four to forty-eight hours, or even more. In the cases with longer remissions the paroxysms are longer. Commonly, however, the paroxysms show material differences; their length averages over twenty hours, instead of ten or twelve; the onset occurs often without chills and even without chilly sensations. The rise in temperature is usually gradual and slow, instead of sudden, while the fall may occur by lysis instead of by crisis. There is a marked tendency to anticipation, while frequently from anticipation of one paroxysm and retardation of another more or less continuous fever may result. In the cases of continuous and remittent fever the patient, when seen early in the disease, has a flushed face and looks ill, the tongue is furred, the pulse full and bounding, but rarely dicrotic. The temperature may range from 102 degrees to 103 degrees or go even higher.

Diagnosis.—The diagnosis of remittent malarial fever may be def-

initely made by an examination of the blood. The small, actively, motile, hyaline forms of the estivo-autumnal parasite are to be found, while if the case has lasted over a week, the larger cresentic and ovoid bodies are usually seen.

Treatment.—The treatment of remittent fever is essentially that of intermittent fever. The continued nature of the fever and the tendency to a typhoid state demands a liquid diet, with the careful addition of stimulants.

PERNICIOUS MALARIAL FEVER OR CONGESTIVE CHILL.

Character.—Pernicious malarial fever differs in no respect from ordinary ague and bilious remittent, except in its greater severity. The disease is observed under three forms: First, the comatose or apoplectic form, the patient speedily loses consciousness, as though the chief force of the poison was expended upon the brain, disturbing its functions to such an extent as almost to abolish them. The fever is usually high and the skin hot and dry. Should the patient regain consciousness a second attack may come on and prove fatal.

Second Form.—In the second or algid form the symptoms of intense chill are prolonged, it may be for some hours, and death occurs in fatal cases from pure debility or asthenia, without reaction coming on. Although the patient is apathetic, the mind remains clear to the last. Vomiting and purging are the prominent symptoms, and the disease might readily be mistaken for Asiatic cholera, if it happened to occur whilst an epidemic of that malady was raging, were it not that the urine is never albuminous.

The Hemorrhagic Form.—In the third group of cases, denominated hemorrhagic malarial fever, the prominent peculiarity is bleeding, generally from the kidneys, but sometimes from the stomach, bowels, nose and mouth.

Diagnosis.—As one might expect, the blood shows marked changes in malarial fever. In the regular intermittent type there is a loss in the red corpuscle after each paroxysm, which may be considerable, but which is rapidly compensated for during the intermissions. In the estivo-autumnal fever the losses are often greater and more permanent.

Treatment.—As in the other kinds, give quinine, but in larger doses. In the case of the pernicious disease to get the effect more rapidly give quinine hypodermically as much as thirty grains at a time. Excessive care must be used to avoid abscesses.

Quinine sulphate ..... 60 drops
Saturated solution tartaric acid ..... 68 drops
Distilled water to make 2 drachms.
Take 30 drops three times daily.

In addition to the use of quinine, stimulants must be given for the asthenia, artificial heat for the low temperature. Morphine hypodermically to relieve pain and allay nausea.

CHOLERA MORBUS.

Definition.—An acute gastro-intestinal catarrh, characterized by profuse vomiting, purging and painful cramp.

Causes.—This malady, which is not contagious, occurs at times almost as an epidemic, and is occasionally fatal, so that no instance of it, however mild at first, ought to be allowed to run on without treatment. Although generally induced by indulgence in indigestible food, especially unripe fruits, there seems to be at certain seasons of the year some external influence promoting the tendency to disorder of the bowels, which is atmospheric. Especially frequent are these attacks in July and August. Cold and dampness are also regarded as predisposing agents.

Symptoms.—The primary symptoms are uneasiness at the pit of the stomach, nausea, retching and then vomiting, followed by severe watery diarrhœa, consisting of a large amount of the watery portions of the blood, and containing only a little albumen. The whole system is thus affected, in part by sympathy, but also to some extent, it is probable, by the change in the specific gravity and constitution of the blood. The attack is often abrupt, a patient being awakened out of sleep by a sudden seizure during the night. This is, however, no doubt because the preliminary uneasiness, nausea and slight colicky pains, which manifest themselves in a diurnal onset of the malady, are unfelt in the unconsciousness of profound slumber. The vomiting and purging, when once commenced, recur in rapid succession, and sometimes even simultaneously, and enormous quantities of fluid are evacuated from the system, often with the result of producing intense thirst. This thirst cannot, however, be gratified for some time, because the irritable stomach refuses to retain the smallest amount of fluid. Collapse may supervene and the skin become cold, clammy and ashen hued, the eyes sunken and the pulse frequent and feeble.

Diagnosis.—The only difficulty about the diagnosis of cholera morbus or sporadic cholera is when true Asiatic cholera is epidemic, then, if a

microscopical examination of the dejecta be made, will, if it be Asiatic cholera, reveal the comma-shaped bacillus.

Treatment.—For the pain in the abdomen hot applications, morphine, one-quarter grain, hypodermically; to be repeated when necessary. When the pain is less severe opium may be given by the mouth or rectum in the form of laudanum—ten drops by the mouth or twenty-five drops in a tablespoonful of thin starch by the rectum. When vomiting is the most troublesome symptom the following is beneficial:

Creosote	6 drops
Bismuth subnitrate	2 drachms

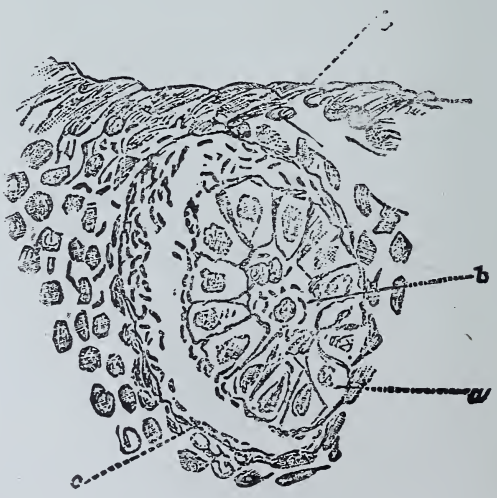
Mix and put into 12 papers. Take one every hour.

The prostration requires stimulants like aromatic spirits of ammonia, thirty to sixty drops at a dose or whiskey.

ASIATIC CHOLERA.

Definition.—An acute infectious disease, due to the implantation of the comma bacillus of Koch, characterized by vomiting, purging, rice-water evacuations and suppression of urine.

History.—It first made its appearance in the United States in 1832. Since that time there have been several epidemics, all of which are traceable to immigration. The most serious epidemic of recent time started in India in the spring of 1892, passing from thence to Persia, Austria, Germany and Holland. A few cases reached London and New York.



The Cholera Germ.

Causes.—The disease-poison of cholera undoubtedly reproduces and multiplies itself during the course of the complaint, being propagated by a contagion, given off mainly, if not entirely, by the evacuations from the bowels, in which the germs of disease propagate themselves, even after their discharge, so that the stools be-

come more virulent after they are passed, especially when mixed with water. The extended researches of Dr. Koch have proved beyond all question the existence of the cholera germ (*comma bacillus*) in drinking water, and traced its development in the intestines of persons who had died of the disease. The illustration shows the appearance of this cholera germ, which it is so important for every one at the peril of his life to avoid. When magnified about six hundred diameters one of the minute intestinal glands may be found to contain, as shown at *a, b* and *c,* minute bacteria or bacilli, as they are technically called, which, from their resemblance to the curved portion of a comma, but without the head of that punctuation mark, have been named the *Comma bacilli.* Sometimes these bacilli unite at their ends with their curves turned in opposite directions, so as to produce an S shape, or even a spiral formation.

This Comma Bacillus is the direct cause of cholera by its lodgment in the intestines, where it has been proved, by examination of nearly one hundred cases, to develop with great rapidity. It is easiest to detect in the earlier stages of the disease, because later on it is obscured by the development of a great many other forms of bacteria. It is distinctive of the mildest as well as of the most severe attacks, and has therefore an important diagnostic value. It is capable of successful cultivation in meat broth, in milk, on slices of potato, and especially on gelatine, in which it grows in a singular manner, producing a gradual liquefaction of the stiff gelatine around the growing colony, which sinks down into the jelly in a peculiar way. The comma bacillus thrives best at temperatures between 70 degrees and 135 degrees Fahrenheit, but is not destroyed and only has its growth checked by a cold of 18 degrees below the freezing point. It is, however, readily killed by drying, by the removal of all animal material upon which it can feed, or by acidifying the medium in which it is growing with a mineral acid. Under ordinary circumstances the bacillus when swallowed is destroyed by the gastric juice being digested in the stomach, but when there is any derangement of the stomach, from errors of diet or any other cause, so that the acid digestive liquid is deficient or absent, the bacillus escapes destruction, and may pass on into the intestine where the fluids are alkaline and it is able to develop with great rapidity. This fact in regard to the growth of the bacillus in alkaline fluids solely is one of great importance, not only in regard to the treatment of cholera, but also in connection with the subject of diet, since it is obviously highly necessary to avoid everything which, by producing

indigestion, could interfere with the production of the precious gastric juice.

Modes of Infection.—In cholera epidemics we have, says Dr. Koch, instances amounting to actual experimental infection of man, as, for example, in the infection of those engaged in washing linen soiled with the discharges from the bowels of patients affected with cholera. An event of this kind is reported in the first outbreak of cholera in this country, when it was introduced into Quebec forty-two years ago.

Infection by Clothing.—Linen or other clothing soiled with choleraic discharges contains the bacilli often in a pure form, and if infection occurs through this medium it must be by the comma bacilli, frequently the only microscopic organism present, except those which are known to be innocent.

Infection by the Hands.—The hands of a person washing or handling such clothes may be soiled, and the bacilli introduced into the mouth by direct contact, or through the food which thus becomes contaminated, or the washing water may come in contact with the lips, and thus in some way the human being be fed with an extremely minute quantity of a pure culture of the comma bacillus.

Infection by Water.—When Dr. Koch was investigating the disease in India he observed an instance in which a certain tank furnished the water for drinking and other purposes to many people among whom the cholera was raging. He found the comma bacilli in this tank, and learned on inquiry that the clothes of the patients were washed in it. Around the tank were some thirty or forty huts inhabited by upward of two hundred people, and of these persons seventeen died, whilst the number of those taken sick was not ascertained. The tank in this case also received the refuse from the dwellings. In fact, it is common in India for the Hindoos to bathe in the tank which affords their water-supply, to wash their utensils in it, to deposit their excrement upon its bank, and if a hut has a latrine, or substitute for one, its outflow is apt to be into the tank. In this particular instance it was found, after a time, that the bacilli became less abundant in the tank-water, and coincidently the cholera declined among the inhabitants of the huts along its shore. Here, if the epidemic had been the cause of the bacilli, instead of the result of their development, the number of these minute organisms ought to have been augmented after the disease began to be less violent. For further dissemination of the disease, the cholera discharge must be retained in a moist state, since complete drying seems to destroy the poisonous property of

the virus; and this view is sustained by what we have long known in regard to the spreading of cholera by contaminated water-supply, or more directly by soiled hands, or even conveyance by insects, as, for example, by blow-flies alighting upon meat and other food. Drains may be infected, and through them the drinking water polluted; but as the virus cannot preserve its activity in a dry state little can be hoped for from aerial disinfection, nor does it seem probable that, except under certain conditions of unusual moisture can cholera be transmitted by merchandise or by letters, even if the latter are not disinfected, but only by human intercourse.

Symptoms.—Period of incubation ranges from two to five days. The symptoms of cholera commonly present themselves sufficiently gradual to admit of arrangement into three distinct groups or stages:

1. **Preliminary Diarrhœa.**—This may set in abruptly without any previous indications. More commonly there are for one or two days colicky pains in the abdomen, with looseness of the bowels, perhaps vomiting, with headache and depression of spirits. As a rule the temperature is not elevated.

2. **The Stage of Collapse.**—Spasmodic griping pains are felt and depression of the powers of circulation and respiration come on, attended with a sense of faintness and oppression over the heart, whose beat at times is hardly discernible, and the pulse at the wrist may be absent. Copious purging, at first of the contents of the intestines, and afterward of a thin, watery fluid, resembling water in which rice has been washed, having an alkaline reaction, and sometimes tinged red with blood, soon commences, and is usually accompanied with violent vomiting and a sensation of burning heat in the stomach. In a short time, perhaps within a few hours, there results from this excessive drain upon the circulation, coldness and dampness of the whole surface of the body, lividity of the lips, cold breath, an unquenchable thirst, a feeble, rapid pulse, difficult respiration, with extreme restlessness, and suppression of the secretion of the kidneys.

Symptoms in Fatal Cases.—In fatal cases are noticed blueness of the whole body, the sunken and horror-stricken countenance denominated the Hipprocratic face, popularly known as the appearance of being struck with death, and a peculiarly suppressed voice, this condition ending either immediately in fatal collapse or in reaction followed by violent secondary fever.

3. **Stage of Reaction.**—This is characterized by return of warmth

and colds, the latter more slowly and the re-establishment of secretions. Especially favorable is the return of the urinary secretion. Along with these changes the vomiting and purging occur at longer intervals. The heart's action becomes stronger, and there are no abdominal pains. Not infrequently this favorable condition is interrupted by a recurrence of a severe diarrhœa, and the patient is carried off in a collapse. Other cases pass into a condition of what has been called cholera-typhoid, a state in which the patient is delirious, the pulse rapid and feeble and the tongue dry. Death finally occurs with coma. These symptoms have been attributed to uremia.

Diagnosis.—The only affection with which Asiatic cholera could be confounded is the cholera morbus, which occurs as a rule during the summer months, of which mention has been made.

Preventive Measures.—Preventive measures are all-important, and isolation of the sick with thorough disinfection have effectually prevented the disease from obtaining a foothold in either the United States or in England.

The course of cholera during the last epidemic which visited the United States, and ravaged the Mississippi Valley in 1873, reaffirmed the lessons of previous outbreaks of this disease abroad. This was especially the case as regards the supreme importance of pure water-supplies in cities and villages, all of which should be boiled before using, and of having all wells and water-springs which are used by the people effectually guarded against any possible soakage and contamination from privies and other sources of defilement by excrement. It must be admitted that the history of outbreaks of cholera, in all parts of the world, conspicuously illustrates the vital importance of procuring all supplies of drinking-water from sources which cannot become polluted by the soakage into them of intestinal discharges, or from outflowings in any such way as to be carriers of bowel-diseases, particularly not of cholera and typhoid fever. The story of the Broad street pump in London, which killed five hundred people in one week during the last great cholera epidemic, and was found to have its water contaminated by soakage of cholera evacuations from an adjoining cess-pool, has already been related, but it should be retold to every one as a terrible warning against the almost universal dangers of water-pollution. An item in the London *Lancet,* printed in 1882, states that a recent analysis of the water of the Holy Well of Mecca, which is so eagerly drunk by the pilgrims, as a part of their religious rites, shows the water to be sewage, about ten times stronger than the average London

sewage. And during the same month that this report was given, came the news that the cholera had made its usual annual appearance among the pilgrims to the shrine of Mahomet in the Holy City of Mecca. It therefore appears extremely probable that by suitable investigation of the water of the Holy Well, there might be found in it a perennial supply of the cholera germs, and such a demonstration of the true origin of the frightful cholera epidemics which, spread by the caravans of returning Moslem pilgrims, have so often devastated large sections of Europe and Asia, would be a triumph for experimental hygiene of which the whole world of science might be proud.

The impurity of the local atmosphere of a dwelling, a village, or a particular district, is proved to be a matter also of public concern, and environed in a polluted atmosphere, the palatial mansions of wealth and gayety may suffer equally with the tenements of the humblest classes. The specific migratory power of cholera, whatever its nature, has the faculty of infecting districts in a manner most detrimental to health only when the atmosphere is fraught with certain products, susceptible under its influence of undergoing poisonous transformations. Through the unpolluted atmosphere of cleanly districts it migrates perhaps without a blow because that which it can kindle into poison is not there.

Disinfection.—1. The vomited matter and the discharges from the bowels are to be gathered and put in a carbolic solution one to twenty, or chlorinated lime one to ten, some of which should be in the vessel before it is used. In the country where the excreta can be thrown in a pit, "whitewash" is a cheap disinfectant.

2. After vomiting, the mouth of the patient should be rinsed with a solution of hydronapthol one to five thousand, care being taken that none of it is swallowed. After each evacuation from the anus the buttocks and thighs should be washed with soap and water.

3. All body and bed linen soiled with the discharges should be immediately moistened with a carbolic solution one to sixty, removed from the apartment in a covered vessel and boiled for one-half hour in a one per cent. solution of washing soda, or 1 to 2000 of bichloride of mercury.

4. Napkins, towels, and so forth, should be treated in like manner.

5. All dishes, knives, forks, spoons, and so forth, after each meal, should be boiled for the same length of time in the same medium.

6. The remains of meals should be thrown in whitewash and removed at the end of each day.

7. Door knobs are liable to be soiled by the hands of one carrying out the excreta and should be carefully watched.

8. In cases of death the body, without being washed, should be wrapped in sheets wet in a solution of bichloride of mercury and should be buried promptly.

Directions for Nurses.—1. Nurses should not hold any direct communication with others while in attendance on the case.

2. They should under no conditions take their meals in the same room with the patient. After touching the patient her hands should be washed in bichloride of mercury one to one thousand.

3. The teeth should be cleansed after each meal, as the mouth affords a peculiar favorable nidus for decomposing matter and would therefore be favorable for the growth of the cholera bacillus.

Treatment.—The successful treatment of cholera depends largely upon how promptly remedial measures are commenced, for if the first sign of relaxation of the bowels is met at once by an energetic astringent and opiate, such as the mixture of a teaspoonful of syrup of galls, ten drops of laudanum, and one drop of chloroform, repeated every hour if necessary, or a compound of ten drops each of spirits of camphor, tincture of capsicum and laudanum, to which, if there is any vomiting, five grains of bismuth should be added, it is certain that many lives might be directly saved by medical treatment. External applications of heat should be made, warm applications to the abdomen will be found grateful to the patient. Sometimes a pill of opium and acetate of lead, with a little capsicum, using, for example, one-half of a grain of opium, two grains of the sugar of lead, and a quarter of a grain of cayenne pepper, is singularly serviceable, and being carried in small compass is especially convenient for travelers.

Pain Treatment.—Should the pain be great control it with one-fourth grain injections of morphine hypodermically. As owing to the profuse discharges the blood is very much concentrated, subcutaneous injections of normal salt solution should be given.

The following well-known cholera or diarrhœa mixture is of great value in the early stages:

Tincture opium	1 ounce
Spirits of camphor	1 "
Tincture capsicum	1 "
Pure chloroform	3 drachms

Alcohol sufficient to make 5 ounces.

Mix and take one teaspoonful every one or two hours.

DIPHTHERIA.

Definition.—An acute infectious disease due to Klebs-Löefler bacillus, characterized by a local fibrinous exudate usually upon the mucous membrane of the throat, with a moderate fever, glandular enlargements and great prostration.

Cause.—The disease is endemic in all large cities, and becomes epidemic at times; while other contagious diseases have diminished in the past decade, diphtheria has increased, particularly in cities.

Contagiousness.—Diphtheria is a highly contagious disease, and is readily transmitted from person to person. The bacilli may be received from (1) discharges of diphtheria patients, (2) from the secretions of the nose and throat of convalescent cases, in which the virulent bacilli persists, (3) from the throats of healthy individuals who have acquired the bacilli from being in contact with others having the virulent bacilli on their persons or clothing.

Dangers of the Disease.—No disease of temperate regions proves more fatal to physicians and nurses. There seems to be particular danger in examining and swabbing out the throat; for in the gagging, spluttering and coughing efforts the patient may cough mucus and flakes of membrane into the physician's throat. The bacillus attaches itself to the bedding, clothes and room of the patient with great tenacity.

Attack Upon Children.—Very young children are rarely attacked, the age of predilection being from the second to the fifteenth year. The greatest number of deaths occur between two and five years of age. Girls are attacked in larger numbers than boys. Adults are frequently affected.

Symptoms.—Period of incubation is from two to seven days; oftener two (Tyson).

According to the location we may speak of the pharyngeal, laryngeal and nasal varieties.

1. **Pharyngeal.**—The symptoms are those of an ordinary febrile attack. Slight chilliness, fever and aching pains in the back and limbs, usually the temperature rises in the first twenty-four hours from 102 to 103 degrees Fahrenheit. There is a slight redness and feeling of soreness in the throat, generally upon one or both tonsils, and on careful examination the tonsils and adjacent portions of the fauces are found to be a little swelled. A whitish-gray patch of false membrane, looking at first like a small ulcer in the mucous surface, next makes its appearance, and this may spread until, by the third day, it has covered the tonsils, fauces and perhaps the uvula.

The False Membrane.—If this false membrane is forcibly torn away, as, for example, by some of the various forceps which were at first invented for the purpose, a raw bleeding surface is exposed, which in a few hours is again covered with a new growth of the layer of membrane. This structure, which is partly composed of an exudation of lymph and partly of a fungoid growth, the micrococcus diphtheriticus, quickly undergoes putrefactive changes, together with the outer layer of mucous membrane lying immediately beneath it, so that there is often a superficial ulceration, from which an unhealthy discharge flows, and a putrid odor frequently emanates constantly, in severe cases of diphtheria.

Thickness of the Membrane.—The thickness and density of the false membrane varies greatly in different cases, and in different epidemics. Sometimes it is scarcely thicker than writing-paper, and has hardly more consistence than thick cream. At other times it is firm and tough, almost like leather, and may even attain the thickness of a quarter of an inch. Although in mild cases and those of moderate severity, its color is grayish-white, in debilitated states of the system, and when there is a tendency to bleeding from the throat and other mucous surfaces, it may be tinged, probably by the altered blood elements of a yellow, yellowish-brown, or dark-brown hue.

Diagnosis.—(*a*) There may be no local manifestation of the membrane, but a simple catarrhal angina, associated sometimes with a croupy cough. The detection in these cases of the Klebs-Löefler bacillus can alone determine the diagnosis.

(*b*) There are cases in which the tonsils are covered with a pultaceous exudate, not a consistent membrane.

(*c*) Cases which begin and often run their entire course with the local picture of a typical lacunar amygdalitis, they may be mild, but in other cases there is a rapid development of membrane and extension of the disease to the pharynx and nose with septic and constitutional symptoms.

2. **Nasal Diphtheria.**—In membranous or fibrinous rhinitis, a very remarkable affection seen usually in children, the nares are occupied by thick membranes, but there is entire absence of constitutional disturbances. Ravenel collected seventy-seven cases, all of which ran a benign course, and in all but a few the membrane was limited to the nose and the constitutional symptoms were slight or absent. On the other hand, nasal diphtheria is apt to present a most malignant type of the disease, high

fever, marked glandular evolvement and great prostration by epistaxis and by excoriation of the lips.

3. **Laryngeal Diphtheria.**—The affection begins like an acute laryngitis, with a slight hoarseness and rough cough, to which the term croupy has been applied. After these symptoms have lasted a day or two, with varying intensity, the child suddenly becomes worse, usually at night, and there are signs of impeded respiration. These cases are always serious.

Difficulty of Breathing.—At first the difficulty in breathing is paroxysmal, owing probably to a spasm of the muscles of the glottis. Soon the dyspnœa becomes continuous, inspiration and expiration become difficult, particularly the latter. The voice is husky and is reduced to a whisper. The color gradually changes and the imperfect aeration of the blood is shown in the lividity of the lips and finger tips. Restlessness comes on and the child tosses from side to side, vainly trying to get breath. Occasionally in severer paroxysms portions of the membrane are coughed up.

The Fever.—The fever is rarely very high, and the condition of the child at the onset is good. The pulse is always increased in frequency. In favorable cases the dyspnœa is not very urgent, and the color of the face remains good. In unfavorable cases the dyspnœa becomes more and more urgent, the cyanosis deepens, and the child, after a period of restlessness, sinks into a semi-comatose state, and death finally occurs from poisoning of the nerve centres by carbon dioxide.

1. **Complications.**—Hemorrhages from the nose or throat may occur in severe ulcerative cases. Skin rashes are not infrequent. In very bad cases, with extensive sloughing, the septic particles may reach the bronchi and excite gangrenous processes, which may lead to severe and fatal hemorrhages.

2. **Renal Complications.**—These are common, albuminura is present in all severe cases; nephritis may set in quite early in the disease; it sets in at times with complete suppression of the urine.

3. **Paralysis.**—This is rather frequent, occurring in from ten to even twenty per cent. of cases.

Diagnosis.—The onset is more sudden than in scarlet fever, the fever higher, the pulse more rapid and the tongue presents a strawberry appearance. For the rest of the diseases it is sufficient to state that, for the purpose of insuring proper sanitary precautions, it is advisable to consider all cases of sore throat, with fever and prostration of strength, in which patches of false membrane, however small, appear upon the tonsils

or fauces, as diphtheritic in their character. All cases should be treated as diphtheria until the contrary is proven by a culture.

Preventive Measures.—Recent investigations having proved that the poison of diphtheria is portable, communicable by infection, and capable of reproducing itself outside of the human body, diphtheria must now be ranked as both a contagious and infectious disease. The following rules are therefore more imperative than ever before:

1. When a child or young person has a sore throat, a bad odor to its breath, and especially if it has fever, it should immediately be separated and kept secluded from all other persons, except necessary attendants, until it be ascertained whether or not it has diphtheria, or some other communicable disease.

2. Every person known to be sick with diphtheria should be promptly and effectually isolated from the public. Only those persons who are actually necessary should have charge of or visit the patient, and these visitors should be restricted in their intercourse with other individuals. Children residing in a house where there is a case of diphtheria should not be permitted to attend school.

3. When a case of diphtheria is fully developed, the same precautions in regard to free ventilation, disposal and disinfection of discharges, bed or body linen, and so forth, isolation during convalescence (or management of the corpse should death unfortunately occur), and so forth, ought to be enforced which have already been recommended in regard to smallpox and cholera.

4. It is particularly important that persons whose throats are tender or sore from any cause, should avoid possible exposure to the contagion of diphtheria. Children under ten years of age are in much greater danger of taking the disease, and after they do take it of dying from it, than are grown persons. But adults are not exempt, and mild cases in them may cause whole series of fatal attacks among children.

5. Numerous instances are recorded where the contagion of diphtheria has retained its virulence for weeks or months, in cesspools, heaps of decaying vegetable matter, damp walls, and so forth, and been carried for long distances in clothing, in sewers, in waste pipes from stationary washstands, and in other conduits. Hence all sewer connections and other carriers of filth should be well ventilated and disinfected, and children particularly should not be allowed to breathe the air of any water-closet, cesspool, or sewer into which discharges from patients sick with diphtheria

have entered, nor drink water or milk which has been exposed to such air or the atmosphere of the sick-room.

6. Beware of any person who has a sore throat; do not kiss such a person or take his or her breath; do not drink from the same cup, blow the same whistle, nor put his pencil or pen into your mouth.

2. **Treatment.**—Local treatment—germicides and disinfectants are best applied when possible by the spraying apparatus at intervals of an hour, or at most every two hours. If the spray cannot be used, as is often the case with children, a soft sponge may be used. The most satisfactory solution for this purpose is equal parts of peroxide of hydrogen and Dobell's solution. Carbolic acid may be used in the proportion of fifteen drops to an ounce of glycerine and water. Boric acid in saturated solution is fairly good. Where there is the laryngeal form the patient should breathe an atmosphere saturated with the vapor of slacked lime. In all cases antitoxin should be given.

2. **Constitutional Treatment.**—For checking the growth of the membrane the preparations of mercury are good. The bichloride of mercury in dose of one-forty-eighth to one-twelfth (Tyson) for an adult, in conjunction with the tincture of the chloride of iron and chlorate of potassium every two hours. Early in the cases calomel in small doses every hour. These doses are given to adults, and they need not be much reduced for children. Quinine should form part of the medical treatment in doses from ten to twenty-four grains in twenty-four hours.

Other prescriptions are:

1.

Bichloride of Mercury .....1 grain
Tincture Chloride of Iron .....1 ounce

Two to six drops every three hours in water.

2.

Chloride of Potash .....1 drachm
Tincture Chloride of Iron .....1½ drachms
Syrup of Lemon .....1 ounce
Spirits of Mindererus .....4 ounces

Mix. Dose: one teaspoonful every two hours.

If this prescription cannot readily be filled a fairly good substitute is the Tincture of Chloride of Iron. Get about one ounce of this and take ten drops in a wineglassful of water three times a day. This is a valu-

able tonic, but if there is much failure of strength, use the following in addition to the chloride of iron:

℞.

Sulphate Quinine (Powder) .....1 drachm
Best Brandy .....1 pint

Mix and dissolve. Dose: two teaspoonfuls every three hours in half a glass of water.

Diet.—Stimulating, nourishing and easily assimilated food is necessary. Milk is preferred to all else, fortified with full doses of whiskey, two drachms to an ounce being required in all severe cases. Milk may be alternated with animal broths. When deglutition is difficult nutrient enematas may be given. For this peptonized milk is best.

Opening the Windpipe.—When laryngeal obstruction is imminent intubation or tracheotomy should be performed. This is rarely necessary when antitoxin is used. Lives have been saved by both these operations. Such cases should breathe air charged with vapor of lime.

3. **Serum Treatment.**—It has been fully demonstrated that antitoxin or the serum of immunized animals, is the best therapeutic agent in diphtheria. The investigation conducted by the American Pediatric Society has shown that the mortality under the serum treatment in 5,794 cases was only 12.3 per cent. The strength of the serum is measured in units, the latter being equal to 1 c.cm. of "normal serum," which is the blood serum of an immunized animal so active that one-tenth of a c.cm. will antagonize ten times the minimum of diphtheria poison fatal to a guinea pig weighing 300 grams. For children over two years old the initial dose should be from 1,500 to 2,000 units in all severe cases, including those of laryngeal stenosis; this dose to be repeated in from eighteen to twenty-four hours if there is no improvement seen, and again in twenty-four hours if the course of the disease is unfavorable. The third dose is rarely necessary. Mild cases should receive 1,000 units for the first injection, a second is rarely necessary. In cases injected during the first two days the mortality is less than 5 per cent. The question of immunizing those exposed to the disease is a very practical one. It has been carried out on a very large scale in some institutions with satisfactory results. The immunity is only transient and only persists a few weeks.

Diphtheria antitoxin is injected beneath the skin and is not a painful procedure and rarely has ill-effects if properly given and the precautions of cleanliness are followed as to the skin of the patient, the

needle used and hands of the nurse and physician. Every adult case should receive a dose of antitoxin of 3,000 units immediately upon the physician being sure that the patient has diphtheria. In severe cases as high as 20,000 or more units have been given in repeated doses without ill effects and the child has recovered. Those in attendance, as nurses, physicians and all persons who have come in contact with the patient, must receive at least 500 units as a preventive measure against taking the disease.

Those who cannot afford to purchase antitoxin can secure it from the authorities of the local Boards of Health in most States. In large cities it can be procured from the police stations.

Every parent or guardian should submit to the early use of antitoxin and thereby save human life. Those exposed to it should also submit and protect themselves and prevent the spread of this highly dangerous and contagious disease. Public funerals cannot be held in case of death from diphtheria. Cremation or burial in a sealed casket is necessary.

General Remarks.—Diphtheria is a highly contagious disease, occurring mostly in children between the ages of two and fifteen years. Infants in the first year of life are rarely affected. Death is most frequent between children of two to five years of age. It occurs mostly during the winter. It can be caught by persons of all walks of life by coming in contact with a patient or his or her clothing, bed linen, etc., which has not been disinfected. It can be carried in water, milk, by the dried discharges from the patient's nose and throat, being blown about in the air, dirty streets, gutters, alleys, cesspools, etc.

It requires from two to seven days for a person to develop diphtheria after being exposed to it. Its early symptoms consist of slight chilliness, in young children convulsions, older children and adults complain of a sore throat. There may be vomiting. Examine the throat at once. The tonsils and arches of the soft palate appear reddened, swollen and a whitish membrane in spots or as a solid layer will be seen covering the tonsils and later on this spreads to the nose, throat, larynx, etc., depending on the severity of the attack. The child will complain of a tightness in the throat, pain or swelling and if the attack is sudden and severe, the face and lips become bluish and breathing is difficult, and there may be a whistling sound upon taking each breath, due to the membrane filling the larynx and throat. The germs of this disease are present in the nose and

throat of the patient. Summon a physician at once. The guardian or physician must notify the local Board of Health.

The sick person must be placed, whenever possible, in a room away from the rest of the family, all unnecessary furnishing removed, a nurse or attendant placed in charge and no one permitted to enter or leave the room but the nurse and physician until disinfection is completed by the Board of Health. Cats, dogs and all the family pets must be removed from the room and quarantined outside of the house. The physician should wear a cotton gown and cover his head with a cloth of suitable texture. The nurse must wear a similar gown and cover the hair with a cloth. On leaving the room, the physician and nurse must leave the head covering and gown in the room, also disinfect their hands in a disinfectant of 5 per cent. carbolic acid solution or bichloride of mercury (1 tablet to a pint of water).

Persons living in a house where diphtheria has developed should not leave until they have taken a bath in water containing bichloride of mercury, washed their hair and had their clothing disinfected by the Bureau of Health. A sheet must be hung across the door leading to the sick room and this sheet dipped in and kept moist by a solution of chloride of lime (1 tablespoonful to a pail of cold water). The knob of the door should be washed off daily with the chloride of lime solution.

INFLUENZA OR LA GRIPPE.

Definition.—An acute infectious disease, appearing at irregular intervals, characterized by extraordinary rapidity of extension and the large number of people attacked.

Causes.—It is caused by the bacillus of Pfeiffer. It spreads with remarkable rapidity. In the large pandemic of 1889-1890 some of the large prisons escaped entirely. The outbreaks of the epidemics are independent of all seasons and meteorological conditions, though the worst epidemics have been in the colder seasons of the year. One attack does not protect. A few persons do not appear liable to the disease.

Symptoms.—Incubation is from one to four days. The onset is usually abrupt, with fever and its associated phenomena. Usually there is coryza and sneezing, with or without watering of the eyes and headache. No age is exempt, as it attacks with impunity the infant as well as the old man. There is generally a cough, to which is added very soon profuse expectorations.

Expectorations.—The cough may be paroxysmal, with prostration at the end of the spell. It often persists, while the bronchitis may pass into broncho-pneumonia, or a croupous-pneumonia may supervene. Another mode of onset is by extreme and sudden prostration. This prostration is apt to be prolonged even in mild cases far beyond what seems reasonable.

Mental Depression.—This is a frequent symptom, and suicide has been its terminal act. There is always more or less fever, ranging from 101 degrees to 106 degrees Fahrenheit. Delirium is nearly always associated with a high fever.

Nausea and Vomiting.—With the onset of the fever there may be nausea and vomiting, or the attack may set in with abdominal pains, profuse diarrhœa and collapse.

Diagnosis.—During a pandemic the cases offer but slight difficulty. The profoundness of the prostration, out of all proportion to intensity of the disease, is one of the most characteristic features.

Treatment.—Isolation should be practiced if possible. Old people should be guarded against all sources of infection. The secretions, nasal and bronchal, should be disinfected. In every case the disease should be regarded as serious and the patient kept in bed until the fever has completely disappeared. From the onset the treatment should be supporting, and the patient should be well fed and nursed. At night ten grains of Dover's powder may be given. At the onset a warm bath is sometimes grateful in relieving the pains in the back and limbs. If there is much fever and delirium small doses of antipyrin or phenacetin may be given and an ice-cap applied to the head. In cases with great cardiac weakness stimulants should be given freely and during convalescence. Strychnia in full doses and good, nutritious diet, cheerful surroundings and change of air are essential. The depression of spirits following this disease is one of its most unpleasant and obstinate features.

GLANDERS OR FARCY.

Definition.—An acute infectious disease, usually commencing with a specific inflammation of the mucous membranes of the nose and throat, and originating in contagion derived from a glandered horse, ass or mule, and characterized by the appearnce of vesicles in the mucous membrane of the mouth and between the toes and nodules beneath the skin; in the latter it is called farcy.

Cause.—The disease belongs to the infective granulomata. The local

manifestations in the nostrils and skin of the horse are due to one and the same cause. Man becomes infected by contact with diseased animals, and usually by inoculation on an abraded surface of the skin. The contagion may also be received on the mucous membrane.

Symptoms.—The disease has an incubation of from three to five days. At this time there is a febrile movement, with malaise and loss of appetite. On the mucous membrane of the lips and tongue and sometimes on the hard palate come vesicles containing a yellowish serum. There is a sensation of heat and burning through the mouth, and the swelling may be so great as to make speech difficult and swallowing painful. There is copious salivation. Almost simultaneously appear vesicles between the fingers and toes and around the nails.

Treatment.—If seen early the wound should be either cut out or thoroughly destroyed by caustics and an antiseptic dressing applied. In the acute cases there is very little hope. In chronic cases recovery is possible, though often tedious.

ANTHRAX OR MALIGNANT PUSTULE.

Definition.—An acute infectious disease of animals, due to the bacillus anthracis, especially affecting cattle and sheep, but transmissible to man.

Causes.—It is very prevalent in Europe and Asia, but is rare in this country. A protective inoculation, with a mitigating virus, has been introduced by Pasteur. In animals the disease is conveyed sometimes by direct inoculation, as by the bites and stings of insects, by feeding on the carcasses of animals which have died of the disease, but more commonly by feeding in pastures in which the germs have been preserved. Pasteur believes that the earth worm plays an important part in bringing to the surface and distributing the bacilli which have been propagated in the buried carcass of an infected animal. Certain fields or even farms may thus be infected for an indefinite period of time.

Symptoms.—Anthrax has a period of incubation of about one week, after which there are a number of modes of manifestation of the disease.

1. **External Anthrax or Malignant Pustule.**—This occurs most frequently on the exposed surfaces, the arms, face or hands, and produces in a few hours a slight redness like that from a mosquito bite, and afterward a little blister. This is soon succeeded by a spreading hardness of the surrounding tissues, which mortify and turn black. Crops of secondary vesicles appear, the neighboring lymphatic glands become in-

flamed, the breath grows fetid, and there is thirst, high temperature and frequent pulse, and death may take place in from twelve to forty-eight hours, with all the symptoms of profound blood-poisoning. Occasionally recovery takes place, but it is only in mild cases, in which all the symptoms, local and general, are less severe; the vesicles dry up into scabs and the hardness passes away.

2. **Malignant Anthrax, Edema.**—This form begins in the eyelid, and from thence passes into the head, arms and hands. It is characterized by the absence of the vesicles and by the most extensive œdema, which may follow, rather than precede, the constitutional symptoms. The most fatal cases are seen when inoculation takes place about the head and face. A feature in both these forms of malignant pustule, to which many writers refer, is the absence of feelings of distress or anxiety on the part of the patient, whose mental condition may be perfectly clear. He may be without apprehension, even though his condition is very critical.

Diagnosis.—Diagnosis can be readily made from the character of the lesion and the occupation of the patient. When in doubt a microscopical examination of the fluid from the pustule may show the presence of the bacillus.

3. **Intestinal Form.**—In these cases the infection is usually through the stomach and intestines and results from eating the flesh or drinking the milk of diseased animals. It may, however, follow an external infection if the germs are carried to the mouth. In acute cases there are dyspnœa, cyanosis, great anxiety and restlessness, and toward the end convulsions or spasms of the muscles.

4. **Wool Sorters' Disease.**—This important form of anthrax is found in large establishments in which wool or hair is sorted and cleansed. The hair and wool imported into Europe from Russia and South America appear to have induced the largest number of cases. Many of these show no external lesion. The infected material being swallowed or inhaled with the dust.

Symptoms.—There are rarely any preliminary symptoms. The patient is seized with a chill, becomes faint and prostrated, has pains in the back and legs and the temperature rises to 102 degrees or 103 degrees Fahrenheit. The breathing is rapid, and there is much pain in the chest. There may be a cough and signs of bronchitis. There may be vomiting, and death may occur within twenty-four hours. In more protracted cases there may be diarrhœa, delirium and unconsciousness.

Treatment.—In malignant pustule, the site of inoculation should

be destroyed by the caustic or hot iron and a little powdered bichloride of mercury sprinkled over the exposed surface. The local development of the bacilli about the site of inoculation may be prevented by the subcutaneous injections of carbolic acid or bichloride of mercury. The injections should be made at various points around the pustle, and may be repeated two or three times a day.

Internal Treatment.—The internal treatment should be confined to the administration of stimulants and plenty of nutritious food. Davies-Colley advises ipecacuanha powder in doses of five to ten grains every three or four hours. In the malignant form, particularly the intestinal variety, little can be done. Keep the bowels active.

ERYSIPELAS OR ST. ANTHONY'S FIRE.

Definition.—This is a specific, contagious inflammation of the skin, tending to spread over large portions of the cutaneous surface with the usual signs of inflammation—pain, heat, redness and swelling.

Causes.—This complaint has, as a rule, for its starting point some slight wound or abrasion of the skin, although occasionally it seems to arise spontaneously, affecting the head and face in such instances more frequently than any other portion of the body. It is particularly prevalent in the spring of the year. It can be conveyed by a third person. The poison certainly attaches itself to clothing, furniture and bed-room walls. Recently delivered women and persons who have been the subjects of surgical operations are particularly susceptible to it.

Predisposing Causes.—Predisposing causes are Bright's disease, alcoholism and debility. The specific agent of the disease is a streptococcus growing in long chains, the streptococcus erysipelatous.

Symptoms.—Period of incubation is variable from one to eight days. The stage of invasions is often marked with a rigor and followed by a rapid rise in temperature and other signs of an acute fever, when there is a local abrasion, the spot is slightly reddened, but if the disease is idiopathic there is seen within a few hours a slight redness over the bridge of the nose and on the cheeks. The swelling and tension of the skin increase and within twenty-four hours the external symptoms are well marked.

The Skin.—The skin is smooth, tense and œdematous. It looks red, feels hot and the superficial layers of the skin may be lifted as small blebs. The swelling increases rapidly, and during the second day the eyes are usually closed.

Further Symptoms.—The first affected parts gradually become pale and less swollen as the disease extends. When it reaches the forehead it progresses as an advancing ridge, perfectly well defined and raised; and often on palpation hardened extensions can be felt beneath the skin, which is not yet reddened. Even in cases of moderate severity the face is enormously swollen, the eyes closed and the lips œdematous, the ears thickened, the scalp is swollen and the patient's features quite unrecognizable.

Blood Poisoning.—The lymphatic vessels and glands, especially the cervical, are almost always more or less affected, and poisoning of the blood as in pyemia not infrequently occurs. One attack of the disease, so far from affording any protection, generally leaves the patient particularly susceptible to the malady for a long time, perhaps for life. Delirium is present, the tongue becomes dry, the pulse feeble and there is marked tendency to death from toxemia. In the majority of cases, however, even with extensive lesions the constitutional disturbances, considering the height of the fever range, are slight.

Treatment.—Isolation must be carried out. A practitioner in attendance on a case of this disease should not attend a woman in confinement. The disease is self-limited, and a large majority of cases get well without any internal medication.

Diet.—The diet should be nutritious and light. Stimulants are not required, except in the old and feeble. For sleeplessness, restlessness and delirium chloral and the bromides may be given, or if these fail, opium; when the fever is high the patient may be bathed or sponged. Of the internal remedies the tincture of the perchloride of iron has been highly recommended.

Local Treatment.—For the local treatment, two per cent. solutions of carbolic acid, the corrosive sublimate solution 1 to 2,000. In the Polyclinic Hospital in Philadelphia the application of ichthyol ointment over the reddened area, and should there be a wound, washing it out with normal salt solution have proved very efficacious. To prevent spreading, paint the margin of the inflammation with tincture of iron.

SEPTICEMIA OR BLOOD POISON.

Definition.—It is a condition in which, with or without a local site of infection, there is a microbic invasion of the blood and tissues, but in which there are no foci of suppuration.

Symptoms.—Illustrative cases of the more usual form of septicemia are puerperal fever, following a retained placenta, infection by scarlet fever, or difficult labor involving lacerations and the poisoning by a dissecting wound. The symptoms set in from three hours to four days, usually twenty-four hours.

Initial Symptoms.—The usual initial symptom is a chill varying in severity; it may, however, be preceded by a headache and malaise and is always followed by a high fever. In bad cases the chill is repeated daily and the temperature rises high. I have known of one instance in which it went to 106.7 degrees Fahrenheit. The patient is restless, the tongue at first red and glazed becomes dry and leathery, the pulse at first full and bounding becomes weak and compressible with a rate of 130 or more. Prostration is marked.

The Fever.—The fever is subject to remissions which give rise to the inexperienced to delusive hope. The chill is followed by profuse sweating and further prostration, the mind early begins to wander and delirium of the low muttering kind is soon established. There is a tenderness over the abdomen in puerperal cases and in all a tendency to enlargement of the spleen with hypostatic congestion of the lungs and often bronchopneumonia will result.

Diagnosis.—This is usually easy, the resemblance of the more serious form to intermittent fever has been referred to. In this disease the remissions are not so total and the patient remains very ill.

Treatment.—In treatment all possible infecting foci should be removed by surgical methods; after this the strength should be supported by quinine, strychnine and stimulants. The food should be liquid and of the most nourishing kind. The fever should be reduced with cold sponging and quinine.

PYEMIA OR PUS BLOOD POISON.

Definition.—Pyemia is a general febrile affection due to sepsis, characterized by recurring chills and profuse sweats with remissions or intermissions in the fever, also by abscesses variously disseminated in the different tissues and organs of the body.

Causes.—The same essential cause lies at the bottom of pyemia as of septicemia, but associated with this disease are the important etiological factors, thrombosis and embolism. Fragments of a venous thrombus, due to a phlebitis at the seat of putrid inflammation, are broken off and carried in the circulation until a lodgment is effected. These

fragments swarm with bacteria and the embolus excites intense inflammation, which goes on to abscess formation. The emboli may be multiple, and there will be as many abscesses as there are emboli. The seats of election are lungs, liver, spleen, kidneys, brain and joints and the various connective tissues in the order above given.

Other Causes.—Other causes are gunshot injuries of bone and compound fractures, gonorrhœa and prostatic abscesses.

Symptoms.—A rapidly rising fever, often so closely followed by a chill that its previous existence is often not suspected. The severity of the chill is proportionate to the intensity of the infection. The temperature during the chill reaches 103 degrees to 105 degrees Fahrenheit, and is followed by a sweat and fall in temperature, after which the latter rises again to a point even righer than was at first attained. The temperature may rise and fall several times, but as a rule each one goes higher than the preceding one.

Other Symptoms.—The other symptoms of fever are also present, thirst, loss of appetite and nausea. The strength of the patient rapidly wanes and he soon sinks into a condition of exhaustion and semi-consciousness from which he may be aroused to take medicine and nourishment.

Diagnosis is not usually difficult; a careful study of the case will show marked differences in history to typhoid fever and malarial fever. There are no rigors followed by sweats in typhoid, and finding the plasmodium malariæ in the blood of suspected patient will settle the case should it be malaria.

Treatment is like that of septicemia. Remove the foci of infection surgically, and after that the symptoms are to be combated and the strength supported to the utmost.

PART II OF BOOK IV

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CURATIVE MEDICINE

PART II.

THE CONSTITUTIONAL DISEASES

Meaning of Constitutional Diseases.—By constitutional or organic disease is generally meant a visible disorder of structure; that disease and disorder are, however, essentially the same thing, is clear from the circumstance that function and organism are united. The state of the organ will always influence the function, just as a power applied to any machinery will produce effects according to the nature of the machine and the materials acted upon. The power and function of the machine are dependent on its intrinsic mechanism, though set to work by an extrinsic influence. The mode of working is not visible in the vital organs, nor are the functions of life mechanical, except so far as they act in time and space.

ACUTE RHEUMATISM OR RHEUMATIC FEVER.

Symptoms.—Acute rheumatism is an inflammation of the joints, characterized by general fever, by pain, heat, redness and swelling of the joints affected, and by a tendency to leave one joint suddenly and fasten upon another. The affection sometimes commences by chills and fever, and general uneasiness; and these symptoms (rheumatic fever) may last for twenty-four hours or more before the local manifestations show themselves. More frequently the local symptoms make their appearance at the same time with the fever, and occasionally they are present some little time before it supervenes.

The Pain.—The pain in the joint or joints affected, commonly but little felt while the patient is perfectly quiet, becomes intense on the slightest motion, so that he is rendered completely helpless. The superficial joints become swollen and tense, they are hotter than natural, and the skin covering them is generally more or less reddened.

The Swelling.—The swelling is sometimes mainly caused by effusion within the capsular ligament of the joint itself, at others by the inflamma-

tion and thickening of the fibrous tissues external to the joint. The pulse is generally full, strong and moderately frequent, rarely rising over 100 beats in a minute; the skin is warm and copious sour perspirations are commonly present; the tongue is thickly coated, the bowels somewhat constipated and the appetite completely lost.

Freaks of Inflammation.—The inflammation at first affects one or two joints, rarely three; after a variable time it commonly leaves the joints first affected as suddenly as it attacked them, and fastens on some other articulation; often, however, new points are attacked without the disease leaving its original seat. As a rule the larger joints are the ones most liable to be attacked, the knees, elbows, ankles, wrists and hips; more rarely the smaller joints of the toes and fingers become affected.

Heart Attack.—Besides the articulations, acute rheumatism frequently attacks the heart, not by metastasis or transferrence of the inflammation from one part to another, but by seizing on the fibrous textures of the heart as in one of the series of textures liable to the disease. Sometimes the pericardium is attacked (pericarditis), sometimes the lining membrane of the heart's cavities (endocarditis). The younger the patient the more liable is the heart to be affected; so that when rheumatism occurs previous to the adult age the heart is attacked in a large majority of cases.

Rheumatism Hereditary.—The rheumatic constitution is frequently hereditary, and rheumatism is peculiarly a complaint of cold, damp seasons and climates.

Causes.—The cause of rheumatism has provoked more thought and research than any of the commoner diseases; at least one type of the disease is due to excess of fibrin in the blood. There is an exudation of this fibrinous material into the sheaths of nerves about tendons, especially where inserted into the bone, the fasciæ of muscles, the serous capsules of organs, their ligamentous attachments, in joints, heart valves, and so forth, wherever fibrous tissue is found normally. This fibrinous exudate organizes into bands, fungus, nodules, and so forth, of cicatricial tissue, obstructing circulation and movement of parts and modifying cell nutrition. The presence of this fibrinous exudate makes the muscles hard and stiff, so that they contract with difficulty and pain, yet appear large and strong. Impinging upon nerves it causes pain and perverted nerve action. Especially is this the case where the deposit occurs near the bony opening whence the nerves emerge.

The Fibrous Exudation.—This fibrinous exudate is precisely like the

membrane of diphtheria, of membranous dysmenorrhea, colitis and croup, the exudate in lobar pneumonia, and so forth. Its appearance in the muscles and other structures is also preceded by a similar weakening of the vaso-motor nerves. When the blood gets into this hyperplastic state it must get rid of the excess of fibrin-forming materials in some way, or it would finally solidify, organize like a clot, and the individual turn to stone. So nature sounds the alarm, and sacrifices a part to save the organism. But sometimes her warnings are not heeded.

A Chief Cause.—The chief exciting cause, we know, is the application of cold to the body when unusually heated. Cold is more liable to produce this effect when combined with moisture, whence a cold and humid atmosphere and wet or damp clothes are the most frequent sources to which rheumatism can be traced. Partial cold, as when parts of the body are subjected to currents of cold air, is very apt to give rise to rheumatism; when the body is predisposed a very transitory exposure of this kind will suffice to bring on an attack; if the current be sustained for any time, few will wholly escape some contingent suffering. Of the fact that rheumatism is so excited there can be no doubt. When it is reflected, however, that for every instance of rheumatism so induced, numbers continually endure as much or greater exposure to the alleged cause without any disease ensuing, too much importance should not be attached to it.

Diagnosis.—The only disease with which it is liable to be confounded is gout. Formerly discrimination in this respect was deemed of high importance, the prevailing theories of gout demanding a course of treatment very different from that to which rheumatism was subjected. In the present day a juster pathology of gout assimilates the treatment of both diseases sufficiently to render extreme accuracy of discrimination of very slight moment.

Prognosis.—The prognosis is dependent on the promptitude with which suitable treatment is resorted to. Generally speaking, there is little immediate danger to life, there being no inflammatory disease of equal intensity which so little deranges the vital functions. This, most probably, is owing to the disease expending its violence in the joints and other external parts, and being little prone to attack the viscera. The peculiar character of the inflammatory action, too, and the little liability which it has to pass into suppuration, or undergo the other changes consequent to phlegmonous inflammation, may account for the safety with which even the metastasis of rheumatism to internal parts is borne. It is certain

that such metastasis is not attended with so much danger as the severity of the symptoms would seem to denote.

Management of Acute Rheumatism.—One of the most important points in the management of acute rheumatism is to watch the supervention of the morbid action in the fibro-serous tissues of the heart. It is not necessary to repeat here the symptoms of pericarditis and endocarditis, but the occurrence of dyspnœa, with more or less anxiety, jerking or feeble and rapid pulse and tumultous action of the heart ought to direct the attention of the practitioner to that viscus, and if he discovers by the physical signs and functional phenomena the existence of inflammatory action there, it must be treated as if the disease were unconnected with rheumatism, for no truth is better established than that, although acute rheumatism, seated in the fibrous and muscular tissues around the joints, is remarkable for its great and rapid change of location; chronic rheumatism loses this mobility when it fixes upon a serous membrane.

Treatment.—1. Acute rheumatism produces, we have seen, diseases of the heart; it is, therefore, incumbent on the practitioner to prevent the continuance of the rheumatic inflammation of the serous membrane of the heart. The indications are to subdue fever and remove inflammation. The promptitude with which the local inflammation in its earliest stage yields to the treatment by which a plethoric state of constitution is corrected, and febrile action allayed, and the obstinacy of the local ailments, whenever the constitutional state is overlooked or inadequately treated, furnish the best proofs of the correctness of this pathology.

2. The treatment has been pursued in various ways—bleeding, mercurials, mercurials with purgatives, opium, sulphate of quinine and nitrate of potassa in large doses have been at various times resorted to. Of these methods, those by large doses of sulphate of quinine and by nitrate of potassa have seemed to have an influence in controlling and cutting short the disease, and the treatment by quinine appears to be successful in the acutest and most violent attacks; but they are both subject to inconvenience and dangers which counterbalance their advantages.

3. The treatment which is most generally relied on is the alkaline. Our aim being to liquefy and eliminate the fibrinous deposit. The iodides, ammonia preparations, jaborandi, hot vapor baths, massage, and counter-irritation have all been employed; overfeeding, especially with meats and highly concentrated foods, should be rigorously avoided. Persons having this fibrous diathesis should employ a resolvent treatment at intervals, for weeks at a time. Exercise must be systematic, and too

much cannot be said of the value of hot vapor baths, massage and joint movements.

4. If the heart shows signs of being affected, and embolism or phlebitis occur, use ammonia, carbonate and acetate with nitro-glycerine, warmth to and rubbing of extremities with mercury to move the bowels. The old custom of venesection and cups, in vigorous subjects, was very fair practice. It made the patient thirsty and so called for diluents to thin the viscid blood. The cups relieved engorged parts, and paved the way for a better circulation through them.

5. The fibrous diathesis varies from that of the uric acid, and the same treatment will not always relieve the rheumatic pains of both. In the former, there is a tendency to congestion of the brain, the liver and kidneys are apt to be sluggish. In the uric acid type of rheumatism irritability is contrasted with the torpor which characterizes the fibrous. Enlarged joints are common, and storms of disease sweep over the system. Muscular development is slight, and the powers of endurance small. In the fibrous diathesis the patient is well developed, tough and resisting.

As rheumatism is invariably accompanied by loss of appetite and embarrassed metabolism, it is naturally the result of accumulated secretions and imperfect excretion, hence it is best treated by freeing the bodily outlets and carefully measuring the supplies. While recognizing the necessity of salicylate treatment, we would advise that such be combined with mild cholagogues, diaphoretics and diuretics. The salicylate appears to exert a general action on all the excretions in the exact proportion in which such is needed.

6. If any organ requires but little correction, it receives no more, and on that account sufficient force is retained to exercise itself where it is more in demand. As a result, the beneficial effects of the salicylic acid treatment are utilized to their fullest extent without being followed by bad reactionary conditions.

Treatment.—Rest in bed and the parts kept warm. The affected parts should be wrapped in cotton. Give freely alkaline mineral waters. In the strong frequent doses of salicylic acid or the salicylates.

R.—Acid Salicylic ..... 1½ drachms
Sodii Bicarb. ..... 2 drachms
Tr. Card. Co. ..... 6 drachms
Syrup ..... 1½ ounces
Water q. s. to make four ounces.
Two teaspoonfuls every three or four hours.

Or,

R.—Sodii Salicylate ..... 3 drachms
Syrup ..... 2 ounces
Water of peppermint ..... 2 ounces
Two teaspoonfuls every three or four hours until relieved.

Or five-grain doses of aspirin every three or four hours. The alkaline treatment can be used by giving the following:

R.—Potass. Bicarb. ..... 1 drachm
Lemon juice ..... 2 drachms
Water ..... 1 ounce

After the acute symptoms and pain have subsided, Basham's Mixture in dessertspoonful doses three or four times a day. Oil of wintergreen applied to the affected joint will often relieve the pain.

MUSCULAR RHEUMATISM.

Of the minor painful maladies this is, perhaps, the most common in many parts of the country. It may attack any muscle, but its three most decided and painful phases are lumbago, stiff neck and pain in the side (pleurodynia), all of which yield to the same or analogous treatments.

Lumbago.—This affects the large muscles of the back and loins, sometimes extending to the lowest parts of the spine. The pain is severe and often of sudden occurrence, very much as if one had sprained his back.

Treatment.—Apply locally chloroform liniment on hot flannel. A porous plaster is often effective. Assume and hold a restful position. Take internally two grains each of quinine and phenacetin, with one twelfth of a grain of belladonna every three hours until relieved.

Stiff Neck.—This is also called cervical rheumatism. It affects the large muscle at the side of the head behind the ear, extending down to the collar or even the breast bone.

Treatment.—Apply locally chloroform liniment on hot flannel. Assume and keep a restful position. Take internally two grains each of quinine and phenacetin, with one-twelfth of a grain of belladonna every three hours until relieved.

Pain in the Side (Pleurodynia) arises from a rheumatic affection of the muscles concerned in breathing, especially the short, flat muscles

between the ribs, called intercostal muscles. It is also called intercostal rheumatism. The pain produced resembles that of pleurisy, and sometimes excites alarm lest some more serious disease is present. A test of the lungs with the stethoscope will determine whether the condition is pleuritic or not. Absence of cough or fever, and soreness, upon touch, of the muscles on the side affected, also show that pleurisy is not present.

Treatment.—1. As in all cases of muscular rheumatism, put the affected muscles at rest as far as possibile. Of course this will be hard to do, because these muscles are engaged as helps in respiration, but the object may be aided by applying strips of adhesive plaster, overlapping each other, around the affected side, so as to compress it tightly.

2. Apply an ordinary porous plaster to the side affected.

3. Treat internally by taking every three hours, until relieved, a dose consisting of two grains each of quinine and phenacetin, with two grains of Dover's powder.

4. Fifteen drops of wine of colchicum, with a quarter of a grain of opium, used in very small but often repeated doses, is often beneficial in all the above forms of muscular rheumatism.

5. In all of the above forms of muscular rheumatism—lumbago, stiff neck and pleurodynia—where the suffering is intense, a hypodermic injection of a quarter of grain of morphia will afford prompt relief.

CHRONIC RHEUMATISM.

Character.—The distinctive characters of this malady are a febrile state of the general system, with more or less pain and swelling in certain tissues and joints. And in this, precisely as in acute rheumatism, the continuance of febrile action undermines the general health, while the local inflammation, however indolent, disorganizes the joints, occasioning eventual decrepitude. The pain and swelling of joints with progressive thickening of the ligaments and effusion in the several bursæ sufficiently evince the morbid actions from which such effects result. But coincident with these will generally be found a quickened pulse, some increased heat of skin and a furred tongue.

Symptoms.—Chronic rheumatism presents itself under two forms. In one of the joints are swollen and painful, the pain being aggravated by motion; there is no general fever and the appetite may be good and the digestion sound. The affection is exceedingly obstinate, attacking new joints without leaving those first affected; it frequently attacks the smaller

joints, rendering them permanently swollen and deformed, while the immobility to which the joints are sometimes reduced may cause atrophy of the muscles connected with them.

Gout.—When the type is precise and definite it presents sharply-drawn distinctive characters which distinguish it from gout; but it must be admitted that there are many cases in which it exhibits so great a resemblance to chronic gout that it is almost impossible to establish an absolute distinction between the two diseases. Mobility is the primordial character of rheumatism; this character at once presents itself. In gout—on the other hand—mobility does not show itself until the malady has become inveterate, until the attacks, which at first were strictly local, have frequently recurred, or the progress of the regular manifestations has been interfered with.

Treatment.—1. In the treatment alkalies and diuretics are of service, also the iodide of potassa, while the different mineral waters are frequently of great service. Warm salt water baths, the use of flannel and stimulating liniments afford relief.

2. It would be vain to enumerate the various stimulants which have obtained character for the cure or relief of this disease. The principal are the different essential oils; various balsams and gum resins; sudorific decoctions; electricity. Any of these may benefit according as the general constitution is prepared for their operation, or as the special ailment may require. If there be no plethoric or febrile state present, their use will at least be harmless, if not beneficial; but should the case be such as to need depletory treatment and the operation of mercury, then must the use of such stimulants as are now named be watched with great caution. Warm bathing and active exercise are among the unexceptionable and most powerful means of relieving chronic rheumatism.

Local Treatment.—1. The local treatment as directed for the regular or acute rheumatism also requires to be assiduously employed. For this various liniments are useful; none are better than those containing oil of turpentine, oil of wintergreen, oil of sassafras, ammonia and laudanum, diluted with soap liniment, or where pain is considerable, chloroform or aconite liniment. Blisters may be applied in obstinate cases. Dry cupping to the back, leaving a number of cups on for twenty or thirty minutes at a time makes a more pervading favorable impression sometimes than might have been expected.

2. For rigidity of the joints and even for pain in them or in the muscles, pouring hot water continuously over the parts does great service.

The hot bath or vapor bath, or, as some prefer, the hot dry-air bath (130 degrees to 200 degrees) will be powerful for relief in many cases.

Electric Treatment.—Electricity also will aid in hastening the restoration of use to the stiffened parts.

SYPHILITIC RHEUMATISM.

This affects the long and flat bones chiefly, and mostly between the joints, not at them. Generally there is nodosity upon the bones affected, or some degree of periosteal inflammation at least. Our main reliance in this affection is the iodide of potassium.

ARTHRITIC RHEUMATISM.

This designation is applied to a form of subacute or chronic inflammation of one or more large joints of greater severity than ordinary chronic rheumatism. Effusion into the joints, with deformity and permanent lameness may occur. The treatment pursued in chronic rheumatism has proved beneficial.

GONORRHEAL RHEUMATISM.

A peculiar inflammation of one or more joints occasionally commencing in the course of gonorrhea or even of urethral inflammation from forced catheterism. The local affection may be severe, with suppuration in a few cases and anchylosis of the joint in many. It appears to be an ichoræmic affection; the result of absorption into the blood of morbid matter effused into the membrane of the urethra.

GOUT OR PODAGRA.

Character.—A painful disease affecting principally the fibrous tissues about the smaller joints and intimately connected with an excess of uric acid and its compounds in the blood. Various names have been given according to the part affected, as podagra when in the feet, chiragra when in the hands, and so forth, but all such and probably many cases of neuralgia, accompanied by oxalic deposits in the urine, are mere forms of one disease.

Symptoms.—A common attack of acute gout is generally preceded by uneasiness, indigestion, loss of appetite, nausea and vomiting, biliary derangement, dull pains or numbness in the parts affected, often with

feverish symptoms; but in some cases, on the contrary, the disease comes on in the midst of apparent health and well-being, and occasionally at night during refreshing sleep. In most cases it makes itself known by an acute pain in the joint of the great toe.

Further Symptoms.—This is accompanied by feverish symptoms, urinary sediment, extreme tenderness, restlessness, involuntary muscular contractions, sleeplessness and perspiration; the affected joint is swollen, red and hot. This series of symptoms may last four or five days, to be followed after a day or two by three or four others, continuing in all from two to three weeks; the severity of the attack, its persistence, its seat and its metastases vary according to circumstances.

Chronic Gout.—When gout becomes chronic the attacks are more irregular, less severe, more frequent and sudden, leaving one joint for another after slight exposure to cold and moisture, excess at table or vivid emotions; in this form the continuance of the pain and the fear of injuring the gouty joints render its subjects cross, frètful and disagreeable.

Chalky Deposits.—Toward the end of the spell chalk-like deposits are thrown out about the joint in some, but not in all cases. The suffering with the gouty inflammation is often very intense.

Hereditary Gout.—Hereditary gout is sometimes podagra or foot-gout, but more often is of the hardening kind. Neuralgia, indigestion, palpitation and urticaria or eczema upon the skin are its most common manifestations. In such a system rheumatism and other affections are to a considerable degree modified by the "gouty tendency."

Causes.—High living with indolent habits generates gout. Even excess of animal food, with scanty exercise, has been known to produce it. But strong wines and malt liquors much increase the tendency. Weak wines do not seem to have the same effect.

Diagnosis.—Between gout and rheumatism there is great resemblance. In gout the small joints are chiefly affected; in rheumatism the larger joints. Repetition of attacks is much more frequent in gout; their duration is greater in rheumatism. In gout the heart is seldom attacked and spasmodically; in rheumatism the heart is often subject to inflammation. In gout the stomach is sometimes spasmodically affected with violent symptoms; in rheumatism, almost never. In gout, and not in rheumatism, uric acid is in excess in the blood. In pure gout, colchicum does good; in rheumatism, hardly ever.

Treatment.—1. There are few diseases which have more empirical remedies extolled for their cure than gout; almost every drastic purgative,

diuretic, tonic and narcotic has been pressed into the service either for external or internal use. To say nothing here of soothing topical applications, colchicum has enjoyed, and deservedly, a great reputation in the treatment of gout and neuralgia between the attacks and in their chronic forms; it is most efficacious when it acts upon the skin and bowels. The acetate of potash and other alkalies are in favor both for their diuretic property and as alkalizing the acid in the blood and urine.

2. During the attack colchicum and the alkalies are the remedies. Wine of the root of colchicum may be given in ten- or twenty-drop doses several times daily. The stomach and bowels are sometimes irritated by large doses; but for a few days most patients will bear fifteen drops thrice daily. It should be stopped when relief has been obtained. Carbonate of potassium—ten to thirty grains at once with half-drachm doses of rochelle salts will be important in addition. Opiates or other anodynes may be craved by the patient during the extremity of his pain.

3. Gouty attacks affecting the stomach or heart spasmodically are usually sudden, violent and prostrating, requiring prompt stimulation, as brandy, laudanum, Hoffman's anodyne or chloroform. Small or moderate doses of one or another of these should be given at short intervals. Mustard plasters to the epigastrium or chest and back will be important, and the feet may be placed in hot mustard water for revulsion.

Diet.—Regulation of the diet is of primary importance. But it should not be too low, especially when the patient's habits have been those of free living. Nourishment must be full, while the digestive power is economized and positive stimulation avoided. Attention to hygienic rules and avoiding exposure to dampness, cold and fatigue of body or mind are absolutely necessary as aids in the treatment of this disease. To promote all this adequate exercise is the natural agent, the use of which cannot be superseded by any medicines however valuable or however lauded.

CANCER, OR MALIGNANT DISEASE.

Cancer is a disease the cause and method of spreading of which is not definitely known. It starts by the growth of cells in an organ or skin of the body which are exactly like normal body tissue, but differ from the cells which are normal for the organ in which it develops. These abnormal cells constituting cancer, renew themselves and encroach upon the normal cells of the organ involved, so that its function is interfered with and ultimately destroyed. Cancer of the stomach, liver, etc., grow until

they encroach upon adjoining organs and practically eats its way into the vitals of the patient until removal or death occurs. Cancer can spread to other parts of the body by the poisonous cells, from the original seat of the growth, getting into the blood and lymphatic channels. As soon as the wall of a blood or lymph channel becomes eaten through these cells are washed to other organs, and wherever they happen to be checked start a secondary growth. This habit of cancer cells traveling by the former method and starting up secondary tumors resembling the primary growth is spoken of as "metastasis." Do you know that after thirty-five years of age one in every eight females and one in every eleven males die of cancer, that the death rate from cancer between the ages of fifty and sixty is not surpassed by any other disease as a cause of death in women, and only slightly by tuberculosis in men.

What are the early signs or danger signals of this scourge, which, if recognized by the sufferer, may save his life?

According to Dr. Childe, the eminent English surgeon, the susceptible localities for cancer are:

(1) Cancer of the breast. Here the danger signal is a small lump or thickening of any kind. In women over forty years old, this lump is a cancer from the start in at least 90 per cent. of the cases. In a woman of any age, the finding of a lump in the breast should be immediately followed by its removal by operation.

(2) Cancer of the uterus (womb). The danger signal here is any irregular bleeding, especially after *menopause* (change of life), or the onset of a discharge in a woman who has been free from it previously, or the change in character of a previously present discharge, so that it becomes more profuse, more foul or more irritating.

(3) Cancer of the lip, mouth and tongue. The danger signal here is a little wart or sore that will not heal.

(4) Cancer of the skin. The danger signal here is any sore that will not promptly heal or any wart or mole which suddenly begins to grow rapidly.

(5) Cancer of the stomach and intestines. Here the danger signals are not so apparent as on the surface of the body. After forty years of age, the onset of obstinate indigestion, persistent colicky pains in the abdomen, persistent diarrhœa and especially the vomiting of blood or the pasage of blood in the stools. Loss of weight.

Prevention.—The cause of cancer is unknown, and whether contagious or not is unsettled. Therefore, we cannot prevent its spread by isolating

the person in quarantine. If the disease were known to be due to a germ or parasite, insects, etc., then it could easily be cured, as other contagious diseases, by destroying the cause and preventing others from contracting the disease by coming in contact with sufferers from cancer. However, any sufferer from cancer in a family should be kept in a separate room, and all doors, windows, etc., screened to keep flies and mosquitoes out, and kill all insects seen that may alight upon the dressings or any exposed surface of the body. Disinfectants should be at hand for the nurse, attendant and physician to disinfect their hands after attending to the patient. All discharges, bedclothing, wearing apparel, dishes, etc., used by the patient should be disinfected with chloride of lime solution (one ounce to half a pail of water) as a precaution.

Treatment.—There is only one way of preventing the spread of this disease, and that is by immediately consulting your physician and informing him of a growth or mole, etc., or any distressing pain or symptoms which affect any portion of your body. *Do not wait. Cancer spreads slowly* and *treacherously* until it has gained a hold, and then it may be too late. When the surgeon sees your case, submit to an operation at once. If the stomach or womb, etc., are involved, you will be saved a slow and painful death. Complete and early removal of a cancer by operation is the safest cure. Even then it will return, but these cases are rare where the patient has acted promptly.

No Medicine Will Cure Cancer—Avoid Patent Medicines.—They are fakes; your money will be wasted, while your tumor will grow. There have been numerous cures recommended in the treatment of cancer where operations cannot be made. The best of these is the Radium Treatment. This is very expensive, but in time the government and our wealthy citizens will see that the poor can receive treatment according to their station in life with a nominal charge or fee. It has cured some cases, but others have succumbed.

Dr. Seelye, of Daytona, Florida, U. S. A., recommends the treatment of cancer (*epithelioma*) by direct sunlight, by concentrating the rays of the sun upon the growth, early, by means of a magnifying glass such as may be purchased under the name of a "reading glass" for half a dollar or less. He claims permanent cures in mild cases so treated.

Common Form of Cancer.—The most familiar and characteristic form of cancer is that which attacks the female breast or womb, usually past the middle period of life. It first appears as a local induration situated

beneath the skin, in the glandular tissue of the organ, for the most part in the neighborhood of the nipple. It increases slowly in size, becomes adherent to the skin and involves more and more of the substance of the breast.

Cancer Pains.—In most cases sharp lancinating pains are experienced at this time, sometimes causing much distress. When the glandular substance of the breast has become fully affected, it is also found to be adherent to the walls of the chest, so that it can no longer be moved from side to side, and the skin over its whole surface is discolored. Smooth in texture, raised in irregular knobs or eminences and in spots red and tender.

The Ulceration.—The early hardness now yields to local softening, the skin gives way at some prominent point, and the ulcer thus formed shows no tendency to heal, but constantly enlarges and discharges a dark-colored and fetid exudation. Subsequently the morbid growth involves the subjacent muscles, the ribs and even the substance of the lungs. Internal cancer, however, is often developed as a secondary affection without being directly continuous with the external growth. The patient may be gradually exhausted by the pain, discharge and constitutional irritation dependent upon external cancer alone, or the fatal termination may be principally due to the secondary affection of the internal organs.

Course of Cancer.—The course of cancer is for the most part slow, requiring several years to pass through its successive stages. This is generally the case in cancer of the breast. In other forms, particularly where the morbid growth is softer and more vascular at the outset it often terminates fatally in a few months or even weeks.

Train of Cancerous Symptoms.—The cancerous humor possesses these characteristics:

1. The peculiar power of infiltrating every tissue as it encroaches upon it.

2. It spreads to the lymphatic glands of the neighborhood through the absorbents.

3. It affects the body generally through the vascular system, thus giving rise to secondary deposits, that is to say, to the development of similar growths in the viscera or remote parts, the lungs and liver being particularly prone to its attack.

4. It is liable to recur after removal.

The stroma is abundant, tough and resisting, giving a tuberoid circumscribed appearance to the mass when superficial. It is of great hardness, and when fully developed is firmly adherent to the adjacent parts.

Upon sections it presents a bluish-white, glistening appearance and yields a creamy, oily fluid known as cancer juice. When situated subcutaneously, as in the mamma, the tumor commonly assumes a dark purple or livid color, and is subject to darting, stinging or neuralgic pains. It is apt to ulcerate, when the sore will present hard and everted edges and the neighboring lymphatics will become indurated and enlarged. It is found most frequently in the mamma, liver, stomach and rectum. It is more frequent in women than in men. It is of slow growth, and rarely occurs before forty or forty-five years of age.

Causes.—The observations which we have made on the relative frequency of cancer as to age, sex-temperament and condition of life contain the greatest part of what we have to say on the predisposing causes of the disease. Among these have long been enumerated the frequent and direct operation of irritating substances; external injuries, especially blows; the abuse of stimulating potions; immoderate indulgence in venery; the depressing influence of moral afflictions; bad food, conjoined with the debilitating effects of cold and otherwise unhealthy habitations; the injurious influence of one or more of these predisposing causes on particular organs being determined or modified by the individual or accidental circumstances of the case.

Cancer May be Hereditary.—The frequent occurrence, however, of cancer in individuals in whom none of these predisposing causes seem to have coöperated in the production of the disease has led many pathologists to consider it as having an hereditary origin.

Transmission of Cancer Germ.—The germ of the disease, or cancerous virus, is transmitted from the parent to his offspring. The evidence on which this opinion rests is shown in the fact that the material element of the disease is contained in the blood, and is separated from this fluid after the manner of nutrition and secretion, either in the molecular structure or on the free surface of organs; and that, while the formation of the disease is thus going on, there may be no appreciable physical or physiological modification of the part in which it is observed. It is thus that we meet with carcinomatous tumors in the brain, which, from their bulk and other characters, must have existed long before the functional disturbance of the organ gave signs of their presence; and we have an equally striking example of the silent development of these tumors in the eye, until acting simply as a foreign body, they obstruct the rays of light and render vision more or less imperfect.

Cancer Pimple.—In persons, too, apparently in the enjoyment of the

most perfect health, we often see the disease making its appearance in the form of a small pimple, proceeding more or less rapidly in its course, extending in breadth and depth and terminating ultimately in death, in spite of all the means which art has devised. In others, a similar pimple arises under similar or even unfavorable circumstances, proceeds like the former to ulceration, and although it may have been neglected, irritated and excited from time to time, disappears and leaves the patient in perfect health.

Diagnosis.—It is not until carcinoma has made some progress that we are sometimes able to recognize its presence in internal organs by means of a careful consideration of the local and general symptoms which we have enumerated. Little importance in general is to be attached to any one of them taken individually. But when the local signs, viz., the changes in the bulk, form and situation of organs, occasioned by the disease, its relative frequency in different organs and in particular portions of the same organ are taken in connection with the special and general modification of function which may be present in individual cases, the greatest possible assistance is afforded us in establishing the diagnosis. Thus it is more easy to detect cancer of the stomach than of the lungs, of the latter than of the brain; because of our being able to ascertain the presence of the greater number of the local signs of the disease in the first case, only a few of them in the second and none at all in the third.

Further Diagnosis.—And when the sense of sight can be applied with that of touch and hearing the diagnosis seldom presents much difficulty, as in the case of carcinoma of the os uteri and rectum. It is necessary to observe that too much reliance is not to be placed on the presence of these general symptoms which constitute the cancerous cachexia, for there are morbid conditions of the stomach and duodenum associated with the derangements of the biliary secretion which give rise to a state of debility and emaciation, accompanied with discoloration of the skin, which so closely resembles this cachexia that the one is not to be distinguished from the other.

Difficulty of Diagnosis.—The difficulty of establishing the diagnosis in such cases is likewise increased by the circumstance that the same chronic character prevails in both. It is hardly necessary to remark that the presence of carcinoma in an external part of the body is to be regarded as a diagnostic sign of great importance in all cases of a doubtful character in which functional derangement of an internal organ has existed for some time. In such a case we should regard the frequent occurrence of vomit-

ing after meals as indicating the existence of carcinoma of the pylorus, even should no tumor be felt in this situation or dilatation of the stomach.

Abdominal Tumor.—If the presence of a tumor were detected in any part of the abdominal cavity we should not hestitate to say that it was of the same nature as the external affection, and the occurrence of paralysis, under the same circumstances, would justify us in attributing it to carcinoma of the brain or spinal cord.

Possibility of Cure.—In no disease is a fatal determination so universally admitted as in carcinoma. The possibility of the cure of cancer of the internal organs has never been supported by substantial evidence, and the examples are few indeed in which we are disposed to believe that the disease has been removed from an external part by surgical or other means, without its recurrence in the same or some other part of the body at some other future period.

Symptoms.—Changes in the color, temperature, circulation and nutrition of the affected organ cannot be detected by direct observation, and those of bulk consistence and form can be determined only in certain organs, and at a more or less advanced period of the disease, such as the stomach and intestines, liver, spleen, kidneys, ovaries and uterus, lungs and mesenteric glands, in all of which organs these changes may be recognized either by the touch, percussion or auscultation. But it is more particularly the change of bulk which is detected by these means, and which, as a local symptom of the presence of cancer, is that to which the greatest importance is to be attached. The increase of bulk which accompanies the presence of cancer is not perceptible until the disease has made some progress. It is most considerable in solid organs, such as the liver, kidney, ovaries and so forth, and is seldom very marked in hollow organs, such as the stomach or intestines.

Further Symptoms.—Considerable increase of bulk may, however, have taken place in the walls of the stomach and intestines without our being able to detect its presence, which happens when cancerous matter accumulates in the direction of the internal surface of these organs. In such cases an increase of bulk of a different kind is produced, viz., dilatation, in consequence of the obstacle presented by the carcinomatous matter to the passage of the food or feces. When dilatation of the stomach is thus produced, the obstacle is situated at the pylorus; when of the small intestines, it is, in the great majority of cases, situated at the termination of the duodenum or commencement of the jejunum and caput cecum coli:

and at the sigmoid flexure of the colon and rectum when the dilatation occupies the larger intestines.

Bulk of Stomach.—The increase of bulk which the stomach and intestines acquire in consequence of an obstacle of this kind is sometimes very great. In some cases of scirrhus pylorus the stomach has been found to occupy the greater part of the abdominal cavity, stretching down to the symphysis of the pubis and from one lumbar region to another; and the large intestines sometimes measure from four to six inches in diameter when similarly affected. We have seen the small intestines equal in size to the ordinary dimensions of the stomach. It is important to know that the extent of the dilatation is not to be taken as the measure of the extent of the disease. The greater the dilatation the greater we may infer is the obstacle by which it is occasioned, but this obstacle may consist in a slight scirrhus enlargement, which prevents the passage of the food or feces as effectually as when it is occasioned by one or more tumors of considerable size or great thickening occupying several inches in length of the whole circumference of the walls of the stomach and intestines.

Pain of Cancer.—The only modification of the sensibility which as a local symptom accompanies cancer is that of pain. There is, however, no symptom of carcinoma more deceptive than pain. Of all varieties of carcinoma it is that of scirrhus which is most frequently accompanied with pain, and it is also in this variety that the pain is most severe, acute and lancinating. Vomiting is an invariable consequence of carcinoma of the pylorus, accompanied with a diminution of bulk of the orifice of this part sufficient to interrupt or impede the exit of the chyme or indigested food.

Vomiting in Cancer.—Perhaps the most frequent cause of vomiting is the mechanical obstacle occasioned by the carcinomatous substance in the pyloric portion of the stomach. The quantity and quality of the matters vomited are variable. Both will be modified by the quantity and quality of the food and drink; the former by the capacity of the stomach and the absence or presence of irritation; the latter by the nature of the ingesta, the state of digestion and the stage and variety of the disease. It is only at the early stage of carcinoma, or at least before softening and ulceration have taken place, that the vomiting consists of a watery or mucous secretion. In the great majority of cases, and always toward the termination of the disease, the contents of the stomach ejected by vomiting contain a substance resembling the lees of wine, a mixture of chocolate or soot and water. The substance may appear in the form of little particles, patches or streaks, and indicates the effusion of the blood into the cavity of the

stomach from hemorrhage, either in consequence of the softening of the carcinomatous matter or the sloughing of this substance and of the contiguous parts.

Cancer of Liver.—Carcinoma of the liver may occur without any appreciable derangement of the special function of the organ being observed. There is often no apparent alteration in the quantity or quality of the bile, even in the most extensive forms of cancer of the liver.

Cancer of Kidney.—There is no apparent modification of the secretion of urine in cancer of one of the kidneys, although the disease may be so extensive as to leave no trace of the natural structure of the organ.

Cancer of Uterus.—The much more frequent occurrence of cancer after than before the cessation of the menstrual discharge, prevents us from estimating accurately the influence which this disease exercises on the special function of the uterus and ovaries. Impregnation, however, has been known to have taken place in carcinoma of the os uteri, and of one of the ovaries.

Cancer of Spleen.—As regards the spleen, its cellular organization may be completely effaced by the presence of the carcinomatous matter, and consequently it is rendered incapable of receiving more blood than is necessary for the nutrition of its solid parts and the growth of the disease.

Cancer of Duodenum.—Cancer of the duodenal extremity of the pancreas, in consequence of the compression of the duct which passes in this direction, gives rise to an accumulation of the secretion of this organ, and great dilatation of the duct throughout its whole extent. Diminished or suspended absorption are the occasional consequences of cancer of the mesenteric and lymphatic glands.

Cancer of Brain.—The functional lesions which accompany cancer of the brain, cerebellum and spinal cord vary considerably with the seat of the disease relative to these organs individually, as well as to particular portions of them. But in neither of these respects does it give rise to any symptoms which can be regarded as pathognomonic of its presence. As a foreign body it gives rise sometimes to a degree of compression sufficient to produce partial or complete paralysis, loss of memory or difficulty of speech and derangement of the intellectual faculties.

Symptoms.—But these latter changes depend principally on the irritation and softening of the substance of the brain in contact with the carcinomatous mass. Even paralysis is more frequently produced by these subsequent changes than by compression.

The Spinal Cord.—Paralysis of the superior and inferior extremities

of the muscles of respiration, and of the bladder and rectum take place in carcinoma of the spinal cord, the seat and extent of the paralysis depending on the portion of the spinal cord occupied by the disease.

General Symptoms.—The general symptoms of carcinoma do not make their appearance before the last stage of the disease. Their severity depends much on the nature of the organ and the extent to which it is affected, but it is principally the irritation produced by the presence of the cancerous substance during the period of softening, sloughing and ulceration that determines the gravity of these symptoms. It is in this, the last stage of the disease, that the circulation and innervation become deranged, and that fever and a diminution of the nutritive function are first observed. It is likewise at this period, but more frequently a few days or weeks before death, that the skin assumes a pale earthy or dull ochrey tint; the debility and emaciation make rapid progress, and all the functions of the economy become implicated in the deteriorating influence of the disease. It is this group of the general symptoms which constitute what is called the cancerous cachexia.

Fever Symptoms.—The febrile symptoms, as well as the diminution of nutrition in general, are greatest when the seat of cancer is the uterus or stomach, and least in those organs as the brain and lungs, in the former of which softening and in the latter compression may terminate in death before either of these symptoms has become conspicuous. General dropsy does not often occur and is never great. Ascites frequently accompanies carcinoma of the liver.

Cancerous Dropsy.—Dropsy of the inferior extremities occurs more frequently in cancer of the ovaries and uterus than of any other organ. It is the consequence of compression of the iliac veins, but it may also be occasioned by the extension of the inflammation which accompanies the ulcerative stage of the disease to these vessels. Compression of the vena cava by tumors in the liver, or by the enlarged mesenteric glands, may also give rise to the same state of the inferior extremities.

Colloid Cancer.—Colloid or alveolar carcinoma is characterized by the stroma being tolerably thick and so arranged as to divide the mass into a number of cystiform chambers, or alveoli, which are occupied by a jelly-like substance. Generally pale and transparent this may be firm as the white of a hard-boiled egg in the older cells, or of the consistency of half dissolved glue or currant jelly. In any form it is non-adherent to the walls of the cells, and may be readily removed. The disease assumes two forms, the circumscribed and infiltrated. The former is met with in

subcutaneous tissue and in the bones of the extremities, constituting the osteo-sarcoma and spina ventosa. The latter is seen in the walls of the alimentary canal. It is of much slower growth than either of the above varieties, and rarely or never ulcerates or softens.

Black Pigment.—Melanosis is a form either of scirrhus or encephaloid, in which a deposit of black pigment has taken place.

Soft Cancer.—Encephaloid or soft carcinoma possesses a matrix less abundant and firm than in the preceding variety. So deficient is this that the mass is of jelly or brain-like consistency. Its cells are for the most part large, with a tendency to assume the caudate form. The growth may be circumscribed (forming tumors often of immense size), or it may occur in the tissues as an infiltration. It is elastic, occasionally fluctuating under pressure, as though pus was present. When opened it shows a whitish-yellow surface, dotted with pinkish spots during life. It is very vascular, giving a purplish-red tinge to the contiguous skin and possessing oftentimes a distinct fruit. Hemorrhage resulting from the spontaneous rupture of some of these vessels is not infrequent, forming apoplectic clots in the interior if confined, but constituting frightful loss of blood if rupturing the matrix. When ulcerated the surface of the tumor assumes a dark, sanguineous appearance, in which condition it is often described as *fungus hematodes*. From the first the peculiar cancerous cachexia is better marked in this than in any other kind of malignant growth. Its most frequent sites are the eye, cavities of face, articular ends of bones, the testicles, uterus and breast. The disease runs its course rapidly.

Skin Cancer.—Epithelioma or epithelial cancer differs from the above in having an imperfectly defined matrix which possesses a tendency to form concentric laminæ around the cellular elements. These are generally mixed up with altered epithelial cells of the parts, and are more constant in their outline than other cancerous growths. Epithelioma is found chiefly at the margin of the mouth and at the anus, though it is occasionally seen on the hands and feet.

Cancer of Bones.—Osteoid cancer is defined as a malignant tumor, usually commencing in the bones, consisting almost entirely of bone and followed by similar growths in the glands and viscera.

Membranous Cancer.—Villous cancer is the name given to cancer in a mucous membrane when covered with a villous or velvet-like growth.

A host of remedies have been proposed for the cure of cancer; the greater number of them have been tried in almost every form of the

disease, but they have nearly all failed to justify the high praises bestowed on their curative virtues.

Remedies.—1. The remedies which retard or arrest the progress of cancer consist of those which exercise a direct or indirect influence on the nutritive function of the affected organ. Among the former are those which operate directly—the local abstraction of blood by means of leeches and compression hold the first rank. The first of these means should be employed for a considerable length of time, at intervals of one, two or three days, and the quantity of blood taken should be regulated chiefly by the strength of the patient. The diminution of bulk of the original tumor which follows this mode of treatment is sometimes very considerable.

2. In the great majority of cases the tumor is not entirely removed. It may be reduced from the size of a hen's egg to that of a nut, and in this state remain stationary for years without giving rise to pain or any inconvenience whatever. The alternate use of local bleeding and compression effect more rapidly the reduction of bulk just noticed than when either is employed separately.

3. Although compression and local bleeding are employed beneficially they are by no means to be altogether relied upon. In consequence of a modification of nutrition in general, and consequently of that of the affected organ, the beneficial effects of some general remedies in carcinoma of external organs are chiefly to be attributed. Some of these remedies appear to modify nutrition by effecting some unknown change in the composition of the blood, as aconitum, conium and arsenic; others, by acting on the capillary circulation and absorption, as mercury, in alterative doses, and various preparations of iodine.

4. The beneficial effects of tonics, as preparations of iron, the fixed and volatile alkalies, mineral waters and all other remedies which increase the vital energies, invigorate digestion and promote absorption and secretion, may also be referred to a favorable change induced in the nutritive function of the affected organ by the introduction of these remedies into the circulating system.

5. The salutary operation of these local and general remedies is much increased by a judicious combination of both, regulated according to the circumstances of individual cases.

Diet.—But while employing any of these remedies it is of the utmost importance to regulate the diet and regimen of the patient in such a

manner that neither of them may interfere with the operation of the remedy employed.

Virtues of Conium.—For example, the curative virtues of conium depend greatly on the quantity of food consumed by the patient, that is to say, the operation of this remedy is more or less powerful when only a small quantity of food was allowed and hardly perceptible when the quantity was considerable.

The following has been our experience with the use of conium in this disease:

1. The patient takes a dose of the extract of conium, morning and evening, two hours before each meal. The amount of the first dose is half a grain, which is gradually increased to six grains each time. This dose is continued for about three weeks in order that the organs may become habituated to its operation, and is afterward increased to twelve grains each time, beyond which it is not necessary to carry the remedy, because of its influence being sufficient. The twelve-grain dose is continued from two to four weeks.

2. After each dose of conium, as well as at meals, the patient uses a glass of the decoction of sarsaparilla.

3. Only the third of the ordinary quantity of food is allowed, which ought to be very simple and divided into three small meals.

4. If the conium disagrees in one form it should be given in another or the aconitum may be used instead, but in lesser quantity than the conium. Toward the end of the treatment the dose of the conium is gradually diminished and the diet gradually increased.

Further Remedies.—The only class of remedies which can be expected to afford any essential benefit are those that are capable of inducing a new condition in the system by modifying the function of nutrition, such as the various preparations of iodine, combined with a thorough change of everything surrounding the individual. The cachexia is the real morbid condition and the cancerous affections in particular organs are but so many evidences of it, as tubercles in the lungs are mere expressions or indications of another form of cachexia, equally possessing the whole system. Hence it is that cancerous tumors on the external parts of the body are so apt to recur after they have been removed by the surgeon.

Removal of Tumors.—Still it must be admitted that in cases of scirrhus tumors, when they have been removed early, there has very frequently been no return of the disease. In such cases the cachexia has been less strongly marked and time, apparently, has not been permitted for the

local mischief to increase the morbid disposition. It would seem, too, that the particular species of cancer influences the probability of recovery. There are a few examples of permanent recovery after the removal of encephaloid tumors.

Remedies for Cancerous Fevers.—The remedies best calculated to prevent, remove or mitigate the local and general effects of carcinoma of internal organs vary with the nature of these effects and the seat of the disease. The state of irritation and fever and pain, at whatever period of the disease they may occur, may be greatly moderated by the use of conium, aconitum, opium, hyoscyamus, the acetate or muriate of morphia, while at the same time the use of all kinds of stimuli is to be avoided, particularly if the digestive organs be the seat of the disease, and the patient himself kept as much as possible in a state of quiet of body and mind.

Treatment.—When cessation of pain and a return of strength and appetite take place, treatment is suspended for a month. It is then resumed for two consecutive months, then suspended for two months, and recommenced, continuing during a month. This plan is pursued for at least two years, which by pursuing the patient is not only greatly benefited, but frequently cured.

Ferruginous preparations must not be omitted when there is great anemia caused by profuse hemorrhage or imperfect nutrition.

Hemorrhages.—Hemorrhages are treated by rhatamy, sulphuric acid and ice. When they have been arrested, and when the pain is subdued, bitters, such as the decoction of cinchona, infusion of quassia, or of Columbo root, are given; sometimes also certain remedies which combine bitter with slightly purgative properties, such as rhubarb, are used; and finally the preparations of iron.

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Mitigation of Pain.—When the carcinoma or cancerous disease has arrived at that period when the cancerous cachexia announces the extensive and fatal termination of the disease, the efforts of the physician must be directed solely to the mitigation of the sufferings of the patient. If this symptom were removed, there are many cases in which carcinoma would run a much longer course, and give rise to comparatively little functional derangement.

Termination of Cancer.—With regard to the termination of cancerous affections of the hollow organs, it takes place frequently in the uterus and stomach, the rectum and urinary bladder, the transverse arch of the colon and jejunum, and the peritoneum. The perforation of the rectum, bladder and peritoneum is the consequence of the extension of the disease from the uterus; that of the transverse arch of the colon, the consequence of its extension from the stomach.

If the os uteri be the seat of the disease additional benefit may be derived from the use of leeches applied to this part, and also sedative injections. It is only in this latter situation that sloughing and ulceration can be detected, and local remedies applied to remove some of the disagreeable effects of the one, or retard the progress of the other. Antiseptic disinfectants are perhaps the best remedies we can employ in this case, as they not only destroy the disgusting odor which accompanies this stage of the disease but remove the putrid and irritating fluids which are then discharged. The retention of the contents of hollow organs from compression or obstruction is an occurrence to be guarded against by regulating the quantity and quality of food, for negligence in this respect may be followed by fatal consequences if the obstacle be situated in the intestines.

Further General Treatment.—The same general treatment is applicable to all forms of cancer. If the growth be well defined, as in carcinoma of the breast, of not very long standing and not involving neighboring lymphatic glands, it may be removed, but severe hemorrhage from a large encephaloid cancer or the complication of important structures in any variety having deep attachments will preclude any operative procedure. Even when extirpated under favorable conditions it is very apt to return, eventually to destroy the patient. The removal of epithelial growths by the knife, or their destruction by caustic applications before glandular

evolvement has supervened, in many instances may effect a permanent cure. In the last few years the X-ray has been used in the treatment of cancer with marked benefit, especially the external variety. In fact, many cures are reported.

Care in Removing Cancerous Growths.—When a cancerous tumor has been removed all surrounding parts should be carefully examined, because it is not uncommon to find small cancerous tubercles in the connective tissue, fascia or muscular sheaths, which, if passed by unheeded, would soon increase and give rise to a recurrent growth.

COLLOID.

Characteristics.—This new growth, formerly called colloid cancer, gelatinous or gum cancer, is no longer considered to be malignant, in the sense of its having the power to infect other and distant portions of the system. Its great characteristic is the formation of a new growth in the large open meshes of which it exists a glue-like, gelatinous, transparent substance like half dissolved gum arabic. This matter is strikingly transparent. Greenish-yellow is its predominant hue. This jelly-like matter is exceedingly soft; a colloid mass is, however, firm and resisting; although not apt to be produced elsewhere, these growths may obtain an immense size and even prove fatal by the disturbances which they cause in the system. Fortunately they are quite rare in this country.

LUPUS OR NOLI ME TANGERE.

Character.—This is a spreading, tuberculosis inflammation of the skin, usually of the face, tending to destructive ulceration. Its name is supposed to be derived from a fancied resemblance which the sores left in the progress of the disease have to the bite of a wolf.

Symptoms.—1. The "lupus erythematosus" occurs chiefly upon the face, and is symmetrical; each patch has well-defined edges and a red, scaly surface with small horny points upon it, due to accumulation in the dilated mouths of sebaceous ducts.

2. The "lupus vulgaris" has its origin in a skin tubercle, or tubercles, of a flat form, fleshy consistence and pink, shining appearance, and these at times ulcerate. This lupus ulceration, when once originated, progresses steadily, destroying every tissue it attacks, and when it reaches the nose, its favorite seat, it simulates cancer.

Treatment.—In the treatment of lupus, although the disease has

probably a constitutional origin and requires tonic treatment, both by medicine and regimen, there is no disease that derives more benefit from local treatment. Quinine, with vegetable tonics; cod-liver oil and iodide of potassium are all useful in this respect. When the ulceration is superficial and the skin is not deeply infiltrated, the local application of cod-liver oil on lint and the covering up of the part with cotton to keep it warm has in some cases worked wonders.

ELEPHANTIASIS OR TRUE LEPROSY.

Symptoms.—This is a constitutional, hereditary affection, essentially chronic in its nature, showing itself mainly as shining tubercles of different sizes, of a dusky red or livid color, on the face, the ears and often on the legs, the skin being thickened, wrinkled, rough, unctuous, devoid of hair, and the perspiration from it highly offensive. After a time there is a circular margin enclosing the central red part free from scales and quite resembling the irregular scaliness of psoriasis.

When the local disease has reached its highest degree a remarkable constitutional affection appears. The patient then becomes very languid, asthmatic, particularly at night time; smothering fits seize him, he coughs violently and spasmodically, and spends the night in perfect sleeplessness, falling into excessive, colliquative, clammy sweats, which give an intolerably fetid odor. His voice becomes weaker and hoarser, the appetite for food and drink is preternaturally increased, and the temper becomes gloomy. Finally, various nervous symptoms arise—fainting, convulsions, paralysis of some parts—and death arrives, preceded by the highest degree of exhaustion.

Causes.—Its origin has been ascribed to want of cleanliness and to unwholesome diet, especially the constant use of bad fish, to long-continued exposure to the heat of a tropical sun, to dampness of situation or occupations requiring the frequent immersion of the limbs in cold water.

Where Occurs.—The disease occurs chiefly in warm climates—Arabia, China, India and some of the West India Islands.

Dry Leprosy.—In this the wasting of the disease is circumscribed, and limited to all the muscles of the hand. The skin is thick, reddened, and completely anesthetic; the fleshy masses have entirely disappeared, and the fingers assume the shape of claws. This disease rarely attacks women. It is accompanied with great torpor of mind and sluggishness of body. Mental depression amounting to extreme melancholy is the natural con-

sequence of so hopeless a malady. Yet the general health, for a length of time, suffers infinitely less than could have been anticipated, the actions of the respiratory and digestive organs continue longer unaffected, and even the cutaneous functions are still tolerably performed, as is evidenced by abundant perspiration.

Progress of the Disease is very slow, and its termination, though it may be deferred for many years, is almost always fatal, the unfortunate patient being in the meantime dreadfully deformed and mutilated, and literally dying by inches. The patches spread slowly till the surface of the whole body may be at length inflicted, and its sensibility lost. There is neither pain nor itching, and usually no swelling. After a few months the internal functions become deranged, the pulse gets very slow and heavy, "as if moving through mud," the bowels grow costive, and there is much sluggishness of mind, and tendency to somnolency. The skin of the extremities becomes fissured and rough, and ulcers appear under the metatarsal or metacarpal joints—the integuments seeming to be simply absorbed—or sloughing off in successive layers of about half an inch in diameter, without any previous tumor, suppuration or pain. A serous discharge ensues and there is loss of sensation and a tendency to ulceration and death of the parts. In the advanced stage of the disease the eyes are fierce and staring, and the voice hoarse and nasal.

Character.—Leprosy is not a contagious disease, but is propagated by inheritance, depending on some specific taint transmitted from parents to children. The two forms of this horrible disorder are the tuberculated and the non-tuberculated or anesthetic.

Treatment.—The only hope of exterminating this dreadful disease appears to lie in the adoption of hygienic measures tending to improve the general condition, both physical and moral, of the leprous poor. Without this medical treatment is of little or no avail, but, with the aid of improved sanitary surroundings, tonics and alteratives, especially preparations of iron and iodine, have a very beneficial effect. Much may be hoped also from the systematic employment of baths, either saline or sulphureted, in this affection.

Leprosy Germ.—A bacteria claimed to be the cause of leprosy, and named the bacillus leprar, was discovered in Norway in 1874, and its existence in the tubercles of this disease has been confirmed, although its causative power has not yet been completely demonstrated.

An internal and external remedy is as follows:

Corrosive sublimate	2 grains
Bismuth subnitrate	1 drachm
Amylum	½ drachm
Arsenious acid	20 grains
Cosmoline	1 ounce

Make ointment. Over a patch of skin three or four inches square rub the ointment in well once daily for about two weeks, then treat a fresh portion until the body is covered.

SCROFULA.

Causes.—A blood disease manifesting itself in a great variety of organs and characterized when fully developed by the presence of a peculiar unorganized matter termed scrofulous. The causes are chiefly hereditary transmission and deprivation of pure air. It is closely allied to pulmonary consumption.

Symptoms.—The scrofulous habit, when strongly marked, is easily recognized. The skin is usually delicate and irritable; the patient suffers very readily from chilblains, and in childhood is more liable than others to cutaneous diseases. The mucous membranes partake the delicacy and irritability of the skin. The edges of the eyelids are apt to be red and swollen; the eye is very liable to be attacked by inflammations; hemorrhages from the nose, cold in the head and enlarged tonsils are frequent. The muscles commonly want firmness, and the whole system is deficient in stamina.

Diagnosis.—Scrofula is eminently a disease of childhood, while consumption belongs to a later period, but neither is confined to any age. One of the forms in which scrofula most commonly and earliest shows itself is swelling of the lymphatic glands in various parts of the body, more particularly about the neck. These become enlarged and firmer, and after a time a deposition of the peculiar curd-like matter is found to have taken place in their interior. After a time suppuration occurs, the swellings become softer and the skin over them assumes a dusky red hue, gradually becomes thinner and finally bursts, giving outlet to an unhealthy pus mixed with the curd-like deposit of the disease. The ulcers left heal slowly and with difficulty, and unless great care is exercised produce deformed cicatrices.

Treatment.—1. In the constitutional treatment of these cases of strumous adenitis, nutritious food, suitable warm clothing, attention to cleanliness and residence in pure air are the most important requisites. Iodine in its different forms, especially the syrup of the iodide of iron, is given

in doses of twenty-five drops thrice daily, and quinine and iron each in grain doses three times a day, with one-sixteenth of a grain of arsenic, or phosphites and hypophosphites of lime and magnesia, in tablespoon doses of the syrup, are frequently of great service. Also the iodide of ammonium in three-grain doses three times a day.

2. In endeavoring to produce a reduction of the swollen glands by causing an absorption of the contents, the tincture of iodine painted on with a camel's-hair brush, or small feather, so as to smart severely but not to raise a blister, and repeated daily for a week or so until the skin peels off is a valuable resource. A milder application of the same remedy is by the use of the ointment of iodine rubbed into the skin over the enlarged gland, night and morning, for weeks and even months if requisite.

3. Cod-liver oil is an anti-strumous remedy of great power, and is more readily taken by the young than by adults; generally sea bathing and sea air are mostly the best of remedies.

Ophthalmia.—Strumous ophthalmia occurs in children between the time of weaning and the end of the ninth or tenth year. Its chief symptoms are redness of the white of the eye, with the formation of little blisters or pustles, often ending in minute ulcers on the cornea or clear portion. The eyes water very freely, and the intolerance of light is excessive, so much so as almost to be indicative of the disease.

Treatment.—The management of these cases will tax the skill of both nurse and doctor to the fullest extent, although internal remedies are often also required, the nursing and outward applications are the most important. Great attention must be paid to cleanliness, and warm bathing of the eyes with anodyne fomentations are very serviceable. Applications of the wine of opium or of a solution of nitrate of silver, of a strength of from five to ten grains in an ounce of water, although they smart severely at first are often of very great benefit.

Diet.—Good diet is indispensable in strumous affections. Hence the invalid should have all the advantages of an abundance of good mutton and beef, vegetables and ripe fruits in season, raw eggs, milk and cream, tepid or cool baths and sea air.

PRESCRIPTION 1.

R.—Cod-liver oil and hypophosphites ..... 5 ounces
One or two tablespoonfuls three times a day.

PRESCRIPTION 2.

R.—Citrate of iron and quinine ..... 10 grains
Cod-liver oil ..... 1 ounce
Glycerine ..... 1 "
Take a tablespoonful three times a day.

RICKETS.

Causes.—The cause of rickets seems to be anything which induces enfeebled assimilation of food and impaired nutrition of body. Hence this affection is sometimes met with in such weakly children of even wealthy parents as suffer from defective action of the vital forces. Like scrofula, it is, however, especially a disease of the poorer classes. Insufficient and especially improper food, the constant respiration of foul, impure air, residence in dark, damp, cold or filthy dwellings, these and similar circumstances readily serve, in all probability, to generate rickets.

Symptoms.—This disease rarely appears before the seventh month, and most commonly does not declare itself until the child first begins his attempt to walk. When a child is about to be affected with rickets he becomes dull and languid, the appetite is variable and capricious, the bowels are irregular, the stools unhealthy and usually pale. Constitutional disturbance now arises, and a febrile state is soon established; the limbs become emaciated; the belly tumid; the face full and the head disproportionately large; the forehead projecting, and the sutures of the cranium remaining open or perhaps expanding slightly. The extremities of the long bones which are least concealed by muscle, as those of the wrists and ankles, and the sternal ends of the ribs, particularly these last, are swelled out into knobs. The legs begin to bend outward at the knee, giving rise to the deformity of bow-legs, or less frequently the knees are thrown forward and the feet outward, making the child what is called knock-kneed, and usually crippling it more or less for life. The bones of the arms and the collar bones may also become very much curved and twisted, showing that the popular delusion as to the cause of bow-legs has little foundation in fact. The deformity of the chest is often very great, the back being flattened, the breast bone pushed forward and the natural curve of the ribs lessened. In such cases the child is said to be pigeon-breasted.

Diagnosis.—This, of course, must be difficult in the early stage, as the symptoms closely resemble scrofula at that time, but after the curvature of the bones commences there can no longer be any doubt, as such softening of the bones during childhood only occurs in rickets.

Treatment.—The medical treatment of rickets must be subordinate to the hygienic, since far more depends upon good food, proper clothing and pure air than on drug medication. Milk diluted with limewater, Liebig's food, and, if the infant is old enough, beef tea, extract of beef, raw meat, eggs, and so forth, should be given in abundance. The phosphates or hypophosphates of iron, lime, quinine and strychnia, as recommended when treating of scrofula, are very useful, and if the child is capable of digesting cod-liver oil it ought also to be administered. Should the diarrhœa be troublesome a chalk and soda mixture, containing a grain of each as a dose for a baby one year old, or a mixture containing a grain of bismuth in each dose for an infant of that age will probably be of essential service, and after the feverish symptoms are controlled the child, in suitable weather, should almost live in the open air, especially if a seaside atmosphere can be obtained.

Diet.—If the disease has occurred at a very early age it may be advisable to try the effect of changing the wet-nurse; and in general it will be proper to wean the child about the end of the ninth month, for protracted suckling is certainly one of the debilitating causes which dispose to rickets. While the child continues at the breast the diet of the nurse or mother ought to be carefully attended to, in order that the milk may prove nutritious and easy of digestion; or its powers may be assisted by allowing the infant, in addition, small quantities of gelatin, beef tea, or yolk of egg, provided the absence of febrile excitement will permit. After the child has been weaned the diet must be suited to the degree of constitutional irritation which exists; but one leading principle should be to support the strength as much as possible without quickening the circulation or oppressing the stomach.

CRETINISM.

Causes.—A condition of persons in whom partial or complete idiocy is combined with great bodily deformity of the whole body, due to bad water, lack of sunlight, and life in deep valleys like those of the Alps.

Symptoms.—There are three varieties, first, complete or incurable cretinism, which is characterized by idiocy, deaf-dumbness, deficiency of general sensibility and entire absence of reproductive power; second, semi-cretinism, which is a degree of the malady in which the mental faculties are limited to the impressions of the sense and the bodily wants. The general sensibility is obtuse, the head is badly formed and drooping,

the speech is rudimentary and the reproductive powers are feeble or absent; third, incomplete or curable cretinism, in which the mental faculties, though limited, are capable of development.

Treatment.—1. The first thing to be accomplished is the removal of the young cretin, as soon as possible after the disease exhibits itself, to a pure, bracing atmosphere.

2. The treatment requires an abundance of pure water for drinking, washing and bathing; warm and cold baths and douches; friction of the skin with brushes and stimulating liquids to rouse its action; warm clothing; mineral tonics; nourishing food; iodine, cod-liver oil and phosphates. The effort to develop the mind must follow the attempt to restore the body to a healthy condition.

DIABETES OR DIABETES MELLITUS.

Causes.—Twice as many men as women have this disease: It is most frequent among young and middle-aged adults; the mortality from it being greatest from fifteen to fifty-five. It is more common in cities and manufacturing districts than in the open country; occasionally it is hereditary. The exciting causes appear to be exposure to cold and wet; drinking cold water largely when heated; excessive use of saccharine food; intemperance; violent emotion; febrile diseases, and organic affections and injuries of the brain and spinal cord.

Symptoms.—In this remarkable disease there is an excessive discharge of urine containing grape-sugar, the saccharine principle of grapes and of honey called glucose, being produced in the body in great quantity and eliminated from the kidneys. The exhaustion, which results from the immense loss of fluid, sometimes amounting to several gallons daily, is often accompanied by other disturbances of the system due to the presence of sugar in the other secretions and in the blood and to the modifications of the nutrition thus effected; opacity of the crystalline lens of the eye—constituting diabetic cataract—is occasionally one of the modifications of structure; shrinking of the substance of the brain is another, and a peculiar form of inflammation of the lungs is another. It is a disease which commonly, after a longer or shorter course, proves fatal.

Diagnosis.—The detection of sugar in the urine, not temporarily, but for a considerable time, is of itself sufficient to make out the case.

Prognosis.—Recovery is not impossible in diabetes, but a large majority of cases end in death. Amelioration—keeping the disease in abeyance—is often an attainable end.

Treatment.—The most positive influence in diminishing the disease belongs to opium or codeina; but this does not appear to interfere with the progress of the disease. The alkalies, pepsin, iron, quinine, salicylate of soda, alum, iodine, nitric acid, turpentine and the inhalation of oxygen have all been employed.

Diet.—Since it is found that the amount of sugar discharged in the urine fluctuates very much in accordance with the starchy and saccharine materials which are eaten, it is the best for the diet of a diabetic patient to be freed, as far as possible, from substances which can be converted into glucose by the digestive organs. Hence the effort should be, in treating diabetes, to abstain from all starchy food as well as from every solid and liquid containing sugar. That meat and eggs may be taken, as a derangement of the liver is not found to be produced by them, and fish is a most important article with which to vary the monotony of the diet. Skimmed milk appears to answer a very good purpose in this disease.

The following prescription is of value in diabetes mellitus:

R.—Salicylate of soda	3	drachms
Fowler's solution	1	drachm
Glycerine	1	ounce
Water	1½	ounces

Mix and take a teaspoonful three times a day.

PURPURA OR LAND SCURVY.

Causes.—It chiefly occurs in individuals of delicate habit or enfeebled by their occupations or mode of life; by confined, low or damp habitations, scanty food, hard labor, grief, anxiety, fatigue and watching. On the other hand purpura frequently occurs where no causes of a debilitating or depressing nature can be supposed to have existed.

Varieties.—The two varieties which are distinguished are the simple and the hemorrhagic, in the latter of which the malady is accompanied by bleeding from some of the mucous membranes of the body.

Symptoms.—Various symptoms denoting general disorder of the system precede the appearance of the spots in purpura, generally for some weeks. In most instances languor, weariness on very slight exertion, faintness and gnawing pains in the stomach are complained of. The appetite is variable, generally poor, but sometimes there is an inordinate desire or craving for food. The tongue is yellowish and coated with a viscid fur, the countenance sallow or dingy, or the face may have a pale and bloated appearance with swelling beneath the eyelids. The purple

spots usually appear upon the legs and afterward without any certain order on the thighs, arms and trunk of the body, and their formation is attended with great weakness and much depression of spirits. Deep-seated pains are felt about the region of the stomach as well as in the chest and loins. One of the most distressing and dangerous symptoms is when the patient becomes of a sallow complexion, waxy-colored and dingy, dropsical swellings of the feet and legs with deep and gangrenous sores appear, general dropsy often prevails and the sufferer dies exhausted.

Diagnosis.—The diseases with which purpura is most likely to be confounded are typhus fever attended with scurvy. The origin and course of the complaint, the period at which the petechiæ appear, the extent and variety of the accompanying hemorrhages will make its diagnosis clear.

Treatment.—1. In the treatment of this disease we are not to be guided by the name or external appearances, but by diligent attention to the symptoms and especially to the state of the functions and the habit and constitution of the patient. Where high excitement prevails with strength of pulse and vigor of constitution, and we have reason to suspect inflammation, purging, with a suitable antiphlogistic diet, are the appropriate remedies.

2. Where a quite opposite state exists all active depletion must be abstained from and the strength supported by beef-tea and other meat nutriment; at the same time tonics, such as quinine or Peruvian bark, the diluted mineral acids in five or ten-drop doses, iron and strychnine, must be administered.

The following offers a good treatment:

R.—Syrup of the superphosphate of iron..... 1½ ounces
Liquor of peroxide of hydrogen ..... 1½ "
Glycerine ..... 1½ "
Water ..... 1½ "
Take a tablespoonful three times a day.

Or,

R.—Oil of turpentine ..... 3 drachms
Fluid extract of digitalis ..... 1 drachm
Mucilage gum-arabic ..... 1½ ounces
Peppermint water ..... 1 ounce
Make an emulsion. Take a teaspoonful every three hours.

SCORBUTUS OR SCURVY.

Character.—This is a disease allied to purpura, but attended with a spongy condition of the gums, and livid patches under the skin of considerable extent, which are harder than the surrounding structure. It has been stigmatized as the great plague of the ocean, and has been denominated sea scurvy to distinguish it from land scurvy or purpura.

Causes.—That the essential cause of scurvy is deprivation of fresh food, and, in almost all cases, of fresh vegetable food, is proved. Fresh meat will retard it in the absence of vegetables, but neither this or oranges and lemons will altogether prevent it through long periods. Additional promotive causes are severe cold, fatigue, exposure and mental anxiety or home-sickness.

Symptoms.—1. Languor, debility and lowness of spirits first occur; then swelling, sponginess and bleeding of the gums; the teeth loosen, and the breath is offensive. Palpitation of the heart and dyspnœa may be present. Spots (from subcutaneous extravasation of blood) appear on the limbs. Diarrhœa and dysentery often come on. Death may take place by a gradual exhaustion or by sudden syncope.

2. A remarkable peculiarity of scurvy is the readiness with which all parts of the body suffer from pressure, and the slightest possible blow may produce an extensive bruise, a small eruption like flea-bites is often to be seen on the legs, and about the same time the muscles of the legs and thighs are apt to become hard and painful, and in a day or two the skin over the painful part grows yellow and then purple. These purple spots may be as large as the palm of the hand at first, and are liable to extend until they cover half of the limb.

3. As the disease advances all the symptoms become aggravated. The loss of physical power increases, the purple spots have a tendency to ulcerate, and the resulting ulcers are especially distinguished by their putrid fungoid appearance, and their great tendency to bleed.

Diagnosis.—Purpura hemorrhagica is undoubtedly not identical with scurvy, although "purpuric" extravasations are common to both. Purpura does not depend, as scurvy does chiefly, upon a fault of diet; nor are the gums affected in purpura.

Treatment.—1. The great remedy for scurvy is lemon or lime juice; in seemingly desperate cases the most quick and sensible relief has been obtained from lemon juice, when no other remedy seemed to avail. When the acid operates violently upon the stomach and bowels of those who are

much weakened, the addition of wine and sugar is strongly recommended.

2. A solution of nitrate of potash in vinegar has been most advantageously made use of in the proportion of one ounce of nitrate in one quart of vinegar, and a tablespoonful of this given two or three times a day.

3. Fresh vegetables alone will restore what is wanting. Potatoes, tomatoes, oranges and lemonade are the most generally available articles. If any medicine is useful as an adjuvant, it is the tincture of the chloride of iron in moderate doses. Sometimes citric acid does good. For the gums a wash of tannic acid or tincture of myrrh in diluted glycerine will be useful, or alum, brandy and water. Salt and whiskey rubbing of the skin will aid in dissipating the petechiæ.

Diet.—Medical men in charge of expeditions to a distance, for ordinary supplies should always insist on measures being taken to furnish enough fresh vegetables, or, next best, dessicated potatoes; after the latter onions, tomatoes, turnips, and so forth, and oranges and lemons rank. Wine is also decidedly though not infalliby anti-scorbutic.

The following is a good anti-scurvy remedy:

R.—Common salt	10 scruples
Chlorate of potash	½ ounce
Rochelle salts	5 scruples
Phosphate of soda	3 scruples
Lemon juice	6 ounces
Syrup of lemon	14 ounces
Water	7 pints

To be used as a drink several times a day.

ANEMIA.

Causes.—Poverty of blood. This is a special, morbid state, in which there is fullness of the surface of the body and deficiency of the red corpuscles of the blood. It is a common affection among women, and persons of both sexes who are ill-fed, or from any cause badly nourished, in crowded localities. It is occasioned by loss of blood, from disease or injury causing hemorrhage, from excessive suckling in a mother or wet-nurse, severe or protracted diarrhœa, or (more rarely) leucorrhea, typhoid or other forms of fever; the malarial influence, sustained for a considerable time; deficiency of food, light, warmth, or fresh air.

Symptoms.—The face, the hands, and the general surface are pallid and slightly waxen or icteroid in their hue. There are vertigo, faintish-

ness, palpitation and an impaired action of the organs generally, especially of the stomach and bowels; digestion being deranged, with flatulency, constipation, and so forth.

Diagnosis.—This is very much aided by the detection of various murmurs, as the watery blood passes through the heart and larger veins. The jugular veins of the neck are often the seat of a well-marked venous hum in profound anemia.

Treatment.—1. In almost all cases it is essential to put the patient on nourishing diet, and especially where the anemia has been caused by imperfect nourishment; yet care must be taken in the very impressible condition of the system which exists in these cases, that undue excitement be not induced.

2. Our first effort should be to supply the materials for enriching the blood, and especially those which are necessary to construct the red corpuscles, a deficiency of which appears to be the essential element in this malady. Iron, which enters into their constitution more abundantly than of any other tissues of the body, is hence obviously called for, and should be administered in whatever form can best be assimilated. Where it is well tolerated there is probably no better preparation than tincture of the chloride of iron, in twenty-drop doses three times daily.

3. In cases where the tincture of the chloride of iron is not applicable, or is objected to by the patient, the powdered iron, called also iron reduced by hydrogen, in doses of a grain thrice daily, can almost always be borne, and is frequently of the greatest service. All the compounds of iron require, however, to be used for a long time, usually several weeks and often for several months, in order to cure the anemic condition.

4. The citrate of iron or the citrate of iron and quinine, in doses of from three to five grains, possesses one great advantage over many other preparations of this useful metal in the fact that while perfectly soluble they produce upon the organs of taste little of that styptic or ink-like impression which to many persons is so exceedingly disagreeable. The beef, wine and iron is also a most valuable remedial agent when properly prepared.

Diet.—The best food which the stomach can digest, and there is no doubt that the iron which exists in beef and mutton and gives much of its red color to the muscular fibres of the flesh, is in the most favorable state for assimilation into the human system, and often has a large share in the improvement which we are perhaps too ready to attribute to the chemical compounds prescribed.

R.—Corrosive sublimate ..... 2 grains
Liquor of chloride of arsenic ..... 1 drachm
Diluted hydrochloric acid ..... ½ ounce
Tincture chloride of iron ..... ½ ounce
Syrup ..... 3 ounces
Water ..... 2 ounces
Take a dessertspoonful in a wineglass of water after each meal.

BERI-BERI.

This is a very fatal but obscure disease occurring in Ceylon, the Malabar coast and outer ports of British India.

Causes.—The causes are very obscure. It is a disease of debility, arising from a want of stimulating and nourishing diet, impure air and exposure to a moist and marshy atmosphere while the frame is debilitated by residence in an unhealthy station.

Symptoms.—It commences with the symptoms of anemia and proceeds to the development of acute dropsy.

Diagnosis.—The paralytic symptoms, together with the dyspnœa and dropsical effusions are sufficient to distinguish it from other diseases. In no disease is internal congestion so strongly marked, doubtlessly due to the congestion of blood in the brain and spinal marrow.

Treatment.—1. Mercury here appears to be the sheet-anchor, but must be administered to produce ptyalism. Saline and antimonial medicines will be called for and the strength supported by cordial liquors. Stimulating liniments should be applied to the extremities and a tonic plan of treatment pursued.

2. In the more severe cases where the dyspnœa, vomiting, spasms and other symptoms are violent apply blisters to the breast, hot fomentations and hot baths, and exhibit the strongest cordials and antispasmodics.

R.—Muriate of pilocarpine ..... 3 grains
Water ..... ½ ounce
Inject 10 to 20 minims with hypodermic syringe.

GENERAL DROPSY.

Definition.—A morbid collection of fluid in one or more of the serous cavities within the body or in the areolar tissue beneath the skin and in other situations.

Causes.—A dropsical accumulation is to be distinguished from the effusion of liquid which takes place in certain inflammatory diseases,

pleurisy, peritonitis, pericarditis, and so forth. In other diseases the effusion is due to inflammation, whereas in dropsy transudation takes place intact, the part where it occurs being inflamed.

Local Dropsy.—Dropsy may be local or general. It is local when the effusion of liquid is confined to a single serous cavity or to the areolar tissue within a limited space.

General Dropsy.—Dropsy is said to be general when effusion into the areolar tissue beneath the skin exists more or less over the whole body, accompanied with effusion into certain serous cavities, especially the pleural and peritoneal.

Symptoms.—The symptoms of dropsy vary somewhat, according to the primary disturbance which has been the original cause of the effusion. If the blood is deteriorated by an undue proportion of water or is charged with excrementitious materials, such as urea, which ought to be eliminated by the kidneys in the urine, or contains a large excess of white corpuscles, its circulation through the capillary vessels is much impeded. The dropsy in these cases often begins in the form of œdema or swelling about the feet and ankles. The reproductive organs often become enormously swollen and ascites or dropsy of the abdomen soon sets in. After a time the increasing ascites, by pressing up the diaphragm, interferes with the respiration, causing distressing dyspnœa, which is more urgent in proportion as the blood is watery from anemia. The urine is often scanty and apt to contain an excess of urates, but it is only markedly albuminous when, as frequently happens, the kidneys become secondarily implicated. Among the latter symptoms are palpitation of the heart, deficient perspiration, mental distress, thirst, constipation, daily increasing weakness, and so forth.

Symptoms of Cardiac Dropsy.—Disease of the mitral or aortic valves in the heart is the most common cause of cardiac dropsy. The injured valve, sooner or later, interferes so much with the circulation that serious disturbances become manifest. At first, perhaps, there is only shortness of breath on going up a steep flight of stairs, or other active exertion, with some palpitation and debility, but after a few weeks or months the feet and ankles may begin to swell, the skin putting on a peculiar white and glistening appearance. As the effusion extends upward rest in the recumbent posture becomes impossible, and even in the sitting position only unrefreshing snatches of slumber can be obtained. The heart's action grows daily more and more embarrassed, the lungs more or less

congested and a frothy expectoration sometimes streaked with blood appears.

Further Symptoms.—In the variety of general dropsy, which proceeds from disease of the liver, serous effusion into the cavity of the abdomen is the most prominent symptom. Whether the original hepatic disorder is congestion or hypertrophy of the liver, cancer, contraction or chronic hepatic inflammation, the dropsical symptoms usually commence with exudation of fluid into the abdominal cavity from the surface of its lining membrance, the peritoneum. Dropsy of the feet and legs, however, subsequently sets in.

Acute General Dropsy.—Acute general dropsy from disease of the kidneys, or acute inflammatory dropsy may arise when the functions of the skin are suddenly suppressed, thus allowing certain morbid materials to accumulate in the blood and to set up inflammation in the secreting tubes of the kidneys. Typical examples of this form of dropsy are seen when, from exposure to cold, the action of the skin is checked during the stage of desquamation of scarlet fever, compelling the kidneys to remove the scarlatinal poison from the system when it seems to be particularly obnoxious to the renal tissues. In such cases the urine either gradually or all at once becomes scanty, dark brown in color, and on being tested by boiling is found to be loaded with albumen.

Diagnosis.—The diagnosis of dropsy is usually made with ease, by the fact that the indentation produced on firm pressure with the finger upon the enlarged foot remains for a minute or so before it is filled up by return of the watery fluid into the connective tissue. This evidence of the existence of dropsy is most conclusively obtained when the test is applied over some bone which naturally lies only a little way beneath the skin, as for example, the breast-bone or the shin-bone.

Treatment.—1. The treatment of dropsy, either local or general, involves measures indicated by the diseases which stand in a causative relation to the dropsy. Exclusive of these indications it is often an object of treatment to effect either removal or diminution of the dropsical accumulation. Remedies which produce watery evacuations from the bowels, and those which increase the secretion of urine are chiefly relied upon for this.

2. The liquid in serous cavities may be removed by a puncture or an incision, an operation called paracentesis, or, commonly, tapping. In some cases of dropsy of the chest paracentesis is resorted to. Tapping of the abdomen is often employed, and is in many cases useful, not only by relieving suffering but promoting recovery.

3. In cases of general œdema or anasarca, if the effusion be very large, great relief is sometimes obtained by minute punctures of the lower limbs, through which the serum drains away in abundance.

4. Where the acute general dropsy is dependent upon suppression of the action of the skin and kidneys, active purgation and the use of diuretics are to be employed. Jalap and cream of tartar (ten grains of the former with three drachms of the latter) every day or two will answer well for catharsis. A strong cathartic is croton-oil. The dose is a single drop, and this will operate in many instances most violently, producing within half an hour sickness, vomiting and profuse alvine evacuations.

Diuretics.—The diuretics most satisfactory are the infusion of juniper berries (a pint daily), acetate of potash, citrate of potash, squills and sweet spirits of nitre. Colchicum is perhaps the most powerful of remedies, and we have succeeded with it in conjunction with mercurials in acting upon the kidneys in hepatic disease when no other remedy had any effect. Tonics, anodynes, and so forth, may, in visceral dropsy, be of more importance than diuretics. Of course it is desirable to lessen the accumulation of fluid, but the effects of the remedies used must be carefully observed, and one symptom must not be allowed to overshadow all the rest.

Diet.—In general dropsy attention to the diet is very important and efforts should be made to restrict the patient to the smallest amount of fluid with which he can sustain life comfortably. With respect to the nicer question of food, dry articles of food should be selected. It must be varied with the nature of the dropsy and the symptoms with which it is attended, and whoever understands the meaning of a phlogistic (inflammatory) and antiphlogistic (opposed to inflammation) regimen will know how to apply either of these, or to vary from one to the other, as circumstances may require.

For general dropsy:

R.—Powdered jalap ..... 20 grains
Cream of tartar ..... 3 drachms
Powdered ginger ..... 5 grains
To be taken at one dose before breakfast, two or three times a week.

Dropsy of kidneys:

R.—Tincture digitalis ..... 1 drachm
Infusion of buchu ..... 4 ounces
Water ..... 4 ounces
Take a teaspoonful every three hours.

Heart dropsy:

R.—Strychina Sulph. ..... ⅔ grains
Bascham's Mixture..... 4 ounces
Two teaspoonfuls 3 times a day.

BRIGHT'S DISEASE.

Albuminuria, dependent upon structural change in the kidneys, or to speak more correctly, disease of the kidney, characterized by albumen and dropsy.

Causes.—It is a glandular disease of the cortical part of the kidney which gives occasion to the secretion of urine, which contains albumen and is of less specific gravity than natural, and which destroys by inducing other diseases. It is one-third more common in males than in females. It mostly occurs between the ages of forty-five and sixty-five. Acute Bright's disease is most often produced by cold and dampness, next by scarlet fever, pregnancy, or violent intemperance. The chronic form is greatly promoted by exposure to cold and wet, and is caused moreover by abuse of spirituous liquors. Other predisposing causes are gout, constitutional syphilis and affection of the bladder and urethra.

Acute Bright's Disease.—After exposure to cold, or a drunken fit, or scarlet fever, the patient is seized with chilliness, headache, nausea, vomiting, pain in the back and limbs, checking of perspiration and oppression in breathing. Fever follows and the face, trunk and limbs become puffy with anasarca. Effusion may also occur in the pleura or peritoneum. The urine is scanty, heavy and dark in color from the presence of blood and very albuminous. The disposition to void it occurs more frequently than in health. The deposit from it, under the microscope, shows blood-corpuscles, loose renal epithelium, tube-casts and shapeless masses of fibrin. After one, two or three weeks, or even a longer period, the attack proceeds to one of three terminations: recovery, death or lapse into the chronic state. Death results through uremia, secondary pneumonia, pleurisy, peritonitis, hydrocephalus or ascites. Probably two-thirds or more of the cases in the acute form recover.

Treatment.—Cupping the loins, hot water or hot air or "blanket bath," active purging, as with cream of tartar and jalap, or citrate of magnesium, and diaphoretics, as citrate of potash or liquor ammonia acetatis.

Diet.—Should be liquid and simply nutritious.

Chronic Bright's Disease.—This approaches so slowly as seldom to be

detected until after the lapse of months or years. Gradual loss of strength, pallor or puffiness of the face, shortness of breath and frequent disposition to urinate are early signs of it. But they are not always present; the denouement of the disease may be by a convulsion, œdema of the lungs, dimness of vision, or some violent local inflammation.

Symptoms.—Albuminous urine, deposits of tube-casts and renal epithelium, dryness of skin, frequent micturition, especially at night; general dropsy, or local effusions into the cavities, indigestion, anemia, uremic effects (headache, dizziness of sight, convulsions, coma, vomiting, diarrhœa), enlargement of the heart and secondary inflammations, bronchitis is especially common. The progress of the case is usually interrupted by exacerbations and intervals; each fresh attack leaving the patient manifestly worse than before.

Diagnosis.—The presence of albumen in the urine, with dropsy, not of sudden origin or brief duration, is indicative of this affection. The microscope will show also free renal epithelium and tubular casts in the urine; in advanced cases the casts are sprinkled with oil-dots.

Treatment.—1. Iron will do more good than any other medicine, unless it be cod-liver oil in persons of strong stomach. They may be very well combined. The tincture of the chloride of iron is as good as any other chalybeate as a general rule. With some the citrate of iron in solution, or a carbonate, or the iodide, will agree more readily. As an astringent the ammonio-ferric alum is claimed to possess the power of checking the waste of albumen through the kidneys.

2. For the dropsy warm baths and hydrogogue cathartics are useful. Of the latter cream of tartar and jalap, two or three drachms of the bitartrate with ten or twenty grains of jalap two or three times a week, are the favorites. If serious dropsical accumulations threaten life, elaterium (one-sixth or one-fourth grain every four hours, in pill, until it acts) may be given, or the pill of squills, powdered digitalis, etc.

3. If the warm baths do not agree or fail to produce diaphoresis try the hot-air bath, at 130 degrees to 150 degrees Fahrenheit. This rarely fails to produce free perspiration. For weaker invalids the vapor bath is available. Of diuretics, acetate of potassium, spirits of nitrous ether, and compound spirit of juniper will be least likely to disappoint.

4. But all will not unfrequently fail. We have as a last resource for the relief of great œdema the use of incisions with a lancet or needle in the swollen legs and feet. Care should be taken that erysipelas does not fol-

low, by repeated warm sponging of the limbs and washing them with diluted glycerine.

Diet.—Nourishing diet, of which milk may generally be part, is of the utmost consequence. Regimen or hygienic management is of the utmost importance. Avoidance of exposure to cold, wet or great fatigue; the reform of intemperance, if it has existed, or all other excesses, will be indespensable. Clothing should be sufficiently warm, with flannel next to the skin. Bathing frequently at such temperature as is borne without either chill or relaxation, and the bowels should be kept regularly open.

The following are approved remedies:

R.—Chloride of soda and gold ..... 3 grains
Corrosive sublimate ..... 3 grains
Extract of gentian sufficient to make 60 pills.
Take one three times a day.

R.—Iodide of soda ..... 15 grains
Phosphate of soda ..... ½ drachm
Common salt ..... 3 drachms
Water sufficient to make solution.
Divide into three equal parts, and take one part every eight hours.

URÆMIC POISONING (URÆMIA).

Uræmic poisoning (uræmia) is also known as acute uræmia, uræmia convulsions, uræmic intoxication and uræmic coma, according to attending conditions. It may be described as a group of nervous phenomena which sometimes develop during the course of acute or chronic Bright's disease, being due to the retention in the blood of what is supposed to be *urea*. An attack of acute uræmia is always serious. The outcome depends upon the amount of poison retained, the length of time it has been in the system and the condition of the organs of elimination. If there be any suspicion of an uræmic condition the urine should be frequently examined.

Causes.—Suppression of urine due to Bright's disease, cancerous kidney, the puerperal or lying-in state, operations on the uterus, bladder, rectum, etc., or any condition causing the failure of the kidneys to properly perform their functions.

Symptoms.—Usually before the attack there is a decrease in urinary secretions, although in rare instances, during or immediately prior to the appearance of the uræmic phenomena, the normal flow of urine may

largely exceed the normal amount. Commonly the onset is with headache, dizziness of vision, vertigo, deafness, dilated and sluggish pupils, dark, unnatural color of face. There is generally a chill or chilliness followed by fever, but there may be cool skin from the onset. The condition may develop slowly and gradually or it may come on suddenly by convulsive seizure followed by coma. In the latter case it is sometimes mistaken for apoplexy, but these differences are to be noted: (a) In uræmia the patient has usually been suffering from dropsy, while this is not common in apoplexy; (b) in uræmia coma is generally preceded by the symptoms above discribed, while in apoplexy coma is usually immediate; (c) the breathing in uræmic coma causes a sharp, hissing sound, while in apoplexy there is snoring; (d) greater or less paralysis always occurs with apoplexy while in uræmia there is no paralysis.

Treatment.—During an attack elimination should be procured by a drop or two of croton oil in a little sweet oil, or a quarter grain of elaterin, or the following enema may be used:

Epsom Salts	2 ounces
Glycerine	1 ounce
Hot Water	4 ounces

Free sweating should be encouraged by the use of hot packs, vapor or hot-air baths and the administration of Jaborandi. To relieve the convulsions give inhalations of chloroform, rectum injections of chloral and venesection.

PART III OF BOOK IV

Describes the nervous diseases and their causes, symptoms, diagnoses, treatments and effects.

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CURATIVE MEDICINE

PART III

NERVOUS DISEASES

Division of Nerves.—1. Motor nerves or those in which irritation produces muscular contraction.

2. Sensitive nerves, or nerves of common sensibility, in which irritation is followed by an agreeable or painful feeling, according to the nature or degree of the stimulation.

3. Nerves of special sense in which irritation excites the peculiar sensations of light, sound, taste, etc. Many sensitive nerves arise from nervous centres in such close proximity to motor nerves that a stimulus applied to the former will react upon the latter and produce not only a direct sensation, but what is technically called a reflex action. It is a remarkable fact that whatever part of a sensitive nerve be irritated, whether it be the centre, the middle, or the extremity, the same sensation will be produced.

Nature of Nervous Force.—We can judge of the nature of the nervous force only by its effects. The muscular contraction caused by the irritation of a nerve is due to the development of a peculiar vital force in the nerve structure, which is unlike any of the known physical forces. It bears certain analogies to electricity.

1. The identity of their effects on muscular fibre.

2. The rapidity of their action without producing any appreciable effect on the parts between the point of irritation and the point affected.

3. The extreme sensibility of nerves to the electric current.

4. The phenomena of electrical fishes.

SOFTENING OF THE BRAIN (Ramollissement).

Peculiarity.—It is the consequence of chronic or acute inflammation, or it may occur from obliteration of the arteries.

Softening of the mucous membrane of the digestive organs is of much more frequent occurrence than softening of the brain.

Causes.—Two causes appear to coöperate in producing softening of the brain. The first is of a mechanical, the second of a physiological nature, serosity, or pus, when in considerable quantity, appear to effect, mechanically, a diminution of the cohesion of the tissue in which they are contained. The pressure which they exercise arrests the circulation, and it would appear absorption also; for if this function were performed we should have an excavation or ulcer formed instead of a mass of soft, pulpy tissue. The circulation being thus arrested nutrition ceases to be accomplished and the molecules of the tissues are disunited and detached. If while these changes are going on, or at some subsequent period, the functions of absorption be resumed, the softened tissue is partially or wholly absorbed and solutions of continuity of various extent are formed. The physiological cause, therefore, of softening is referable to a change in the vital properties of the affected tissue.

Degree of Softening.—The degree of softening of the cerebral substance may vary from a slight diminution of the natural consistence of the part to that of cream or even of thin milk. The first stage of softening of this substance is often so slight that it is hardly perceptible to the touch, and may, even when considerable, if not accompanied by some peculiarity of color, be altogether overlooked.

Physical Characters.—The color of inflammatory softening of the cerebral substance presents considerable variety, dependent on the quantity of blood contained in the affected part. Redness and vascularity are, in general, greater in the first than in the second stage, but the degree and extent of either greatly depend on the quantity of blood in the cerebral vascular system. When the redness which accompanies softening arises from the presence of effused blood it may always be regarded as evidence that the softening is of recent occurrence.

Other Evidences of Softening.—But there are other modifications of color which accompany softening of the cerebral substance. They indicate that the disease has existed for a considerable time, several weeks, or two or three months. The principal modifications of color consist of brown, yellow and orange, either separately or combined, and occupy either the softened substance, the part of the brain contiguous to it, or both at the same time. They are not observed unless the softening has been accompanied by effusion and originate in changes taking place in the effused blood.

When Softening May Occur.—Softening may occur in the brain and medullary substances at the same time. It may also occupy several por-

tions of the brain at the same time, as the septum lucidum, fornix and walls of the lateral ventricles, the corpora striata and thalami, one or more lobes, a portion of one or both hemispheres, the brain and cerebellum, and is rarely met with in the latter organ without its being present in the former. Circumstances which give great variety and complexity to the functional derangement by which it is accompanied.

Symptoms.—As the symptoms of the first period of inflammatory softening of the brain must necessarily be those of inflammation of this organ, it would be superfluous to describe them here. It may, however, be observed that the severity of these symptoms does not always indicate a corresponding condition as to the extent of the softening which they precede, nor do they present any one character which can be regarded as a sign that the inflammation on which they depend will terminate in softening. When, however, they are taken in conjunction with those of the second period, they are frequently of great value as they afford us the means of establishing our diagnosis in cases where it would be otherwise impossible.

Symptoms of Second Period.—The symptoms of the second period of inflammatory softening of the brain are of an entirely opposite character to those of the first period. Those of the first depending on the presence of irritation, or a morbid stimulus, are characterized by a state of excitement; whereas those of the second being the consequence of the softening or disorganization of the cerebral substance, are necessarily marked by a state of prostration, collapse or paralysis. They are announced by the gradual or sudden diminution of the intellectual powers, by the occurrence of stupor or coma, by paralysis, difficulty or loss of speech and diminution of the sensibility of the skin, eye and ear. The relative frequency, degree and extent of these symptoms, as well as the order of their occurrence, present considerable variety. Thus, the derangement of the intellectual faculties, such as their diminution, suspension or abolition, is always present at the commencement of the second period, that is so soon as the softening of the cerebral substance has taken place. In some cases the derangement which they manifest is at first slight, increases gradually or rapidly and terminates in their entire abolition. In others these faculties are, from the commencement, gravely compromised and give no signs whatever of their existence.

Peculiar Symptoms.—It is not rare to meet with cases in which their derangement is marked by remissions and exacerbations, or the occurrence of lucid intervals succeeded by profound stupor. The delirium which

accompanies the first period of inflammatory softening either disappears or diminishes greatly in intensity when the second period is announced by the derangement of the intellectual faculties to which we have alluded. It diminishes with the diminution of these faculties and ceases when their suspension or abolition is indicated by the presence of coma and complete paralysis.

Loss of Memory.—An imperfect state or the entire loss of memory and speech are necessary consequences of these latter conditions of the intellectual faculties. But the absence of any derangement of these faculties is not necessarily unaccompanied by derangement of memory and speech, particularly the latter, for a patient may recover the consciousness of his existence, perceive and comprehend what is passing around him, and yet be incapable of expressing himself in words on account of paralysis of the muscles by means of which the act of speech is accomplished. The diminution, suspension or abolition of the intellectual functions are always accompanied with paralysis of the muscles of voluntary motion, and the degree of the paralysis is, generally, in the direct ratio of the extent of the derangement manifested by these functions.

Brain Paralysis.—The paralysis is rarely complete at the commencement. It is generally progressive with occasional alternations of increase and decrease before it becomes ultimately complete. The situation and extent of the paralysis present considerable variety and in many cases seem to correspond with the situation and extent of the softening, in the same manner as in apoplexy. The paralysis occupies one or both extremities of the same side when the softening is limited to one of the hemispheres of the brain, and paraplegia or universal paralysis is produced when both hemispheres, the pons varolii, etc., are the seat of this lesion. Paralysis occurs more frequently in the superior than in the inferior extremities; the seat of the lesion of the former being in the corpus striatum, and of the latter, the optic thalamus of the opposite side of the brain.

Paralysis of Face Muscles.—Paralysis of the muscles of the face, of the eye, of the tongue and of deglutition, depends likewise in the situation of the softening. Paralysis of the bladder and rectum is a frequent occurrence of softening of the brain, and gives rise, in the first place, to an accumulation of the contents of these organs, and afterward to their involuntary escape, more particularly of the urine, from the distension of the bladder and the subsequent dilatation of its sphincter. It is under similar circumstances of the brain that the organs of hearing and of sight,

which in the first inflammatory period of softening are highly susceptible, are rendered obtuse to a degree that a strong light or loud sounds impressed on the eye and ear pass unperceived.

Permanent Muscular Contraction.—One of the most constant symptoms of inflammatory softening of the brain is a state of permanent contraction of the flexor muscles of the extremities.

The last symptom which we shall notice is that of pain. This does not depend on the state of softening of the cerebral substance. It is the consequence of irritation or morbid excitement of the brain, the disorganization of which has not yet taken place. It is generally most severe when it occurs as a precursory symptom, but it frequently accompanies the first period of the disease, and presents remission and exacerbations, variable in duration and degree.

Treatment.—There are no successful cases recorded of softening from obliteration of the arteries, and in the few cases of the inflammatory forms of the disease, which have terminated favorably, it is more than probable that the softening was very limited in extent and affected the superficial or less important parts of the brain. As regards the state of softening, which, in point of fact, consists in a solution of continuity of the cerebral substance, it must be obvious that we possess no remedial agent capable of obviating such a change. The diseased state, therefore, of which we are treating, is incurable; that is to say, the solution of continuity of which it consists will remain, even though the patient should recover. The essential part of the treatment of softening of the brain relates, consequently, to the local morbid conditions which immediately precede this change, viz.: the diseased state of the arteries on the one hand and inflammation of the brain on the other. This state of the arteries, like the softening to which it gives rise, is, so far as we yet know, beyond the control of remedial agents. When, therefore, it is ascertained that the softening is the consequence of this state of the arteries, the only hope that can be indulged is partial relief, and the prolongation of life for a short period beyond that at which the disease would have proved fatal had it been allowed to run its natural course.

Staying Treatment.—It is possible that the attack may be delayed by judicious treatment, employed when the first symptoms of cerebral derangement are perceived, such as pain in a particular part of the head, confusion of ideas, giddiness or unusual drowsiness and listlessness, together with a prickling sensation or numbness in the muscles of the extremities, face or tongue.

THE BRAIN.

FIGURE No. 1.

1,1,1,1. Motor track delineated from the front columns of the spinal marrow to the hemispheric ganglion.
2. Pyramidal body.
3. Eminences in the medulla oblongata.
4. Variolus bridge.
5. Legs of the brain.
6. Streaked body.
7. Hemispheric ganglion.
8. Cerebellum.
9. Olfactory nerve.
10. Optic nerve.
11. Fourth pair of nerves.
12. Sensory root of the fifth pair.
13. The seventh and eighth pairs of nerves.
14. Front suture.
15. Mammillary elevation.
16. Corpora geniculatum.

FIGURE No. 2.

1, 1. Section of the callous body.
2. Transparent partition.
3. Front column of the vault.
4. Section of front suture.
5. Central substance of the chamber.
6. Sylvius' aqueduct.
7. Pineal gland.
8. Medullar band which extends from the pineal gland to the front suture.
9. Section of the legs of the brain.
10. One of the white bodies, or mammillary bodies.
11. Gray excrescence.
12. Section of the intricacy of the optic nerves.
13. Optic nerve beyond the intricacy.
14. Olfactory nerve.
15. Front surface of the hemisphere.
16. Fissure between the back and middle lobes of the brain.

FIGURE No. 3.

1. Front extremity of the fissure of the brain.
2. Back extremity.
3. Front lobes of the brain.
4. Middle lobe.
5. The sylvius fissure.
6. Back lobe.
7. Infundibulus point.
8. Its body.
9. White or mammillary bodies.
10. Ash-colored matter.
11. Legs of the brain.
12. Variolus' bridge.
13. Upper end of the medulla oblongata.
14. Back prolongation of the variolus bridge.
15. Middle of the cerebellum.
16. Front part.
17. Back part.
18. Upper part of the spinal marrow.
19. Middle fissure of medulla oblongata.
20. Pyramidal body.
21. Rectiform body.
22. Oval body.
23. Olfactory nerve.
24. Its bulb.
25. Its external root.
26. Its middle root.
27. Its internal root.
28. Optic nerve beyond the intricacy.
29. The same before the intricacy.
30. Motor of the eye or third pair.
31. Pathetic nerves or fourth pair.
32. Trigeminus or fourth pair.
33. External motor or sixth pair.
34. Facial nerve.
35. Auditive nerve.
36,37,38. Eighth pair.

FIGURE No. 4.

1. Vertical section of the head.
2. Frontal cavity.
3. Greater *falce* of the brain.
4. Its origin from the rooster's comb.
5. Its union along the sagital suture.
6. Under or concave edge.
7. Counteraction to the cerebellum store.
8. Cerebellum store.
9. Union to temporal bone.
10. Free edge of same.
11. Tortuous elevations of the front right lobe of the brain.
12. Front extremity of the callous body.
13. Transparent partition.
14. Section of the front suture.
15. Front parts of the vault.
16. The middle of same.
17. Back end.
18. Inner side of the bed.
19. Section of streaked bodies.
20. Side walls of the third ventricle.
21. The dura mater, turned upside down.
22. Section of the internal carotid artery.

FIGURE No. 5.

1. Front lobe of the brain.
2. Back lobe.
3. Middle lobe.

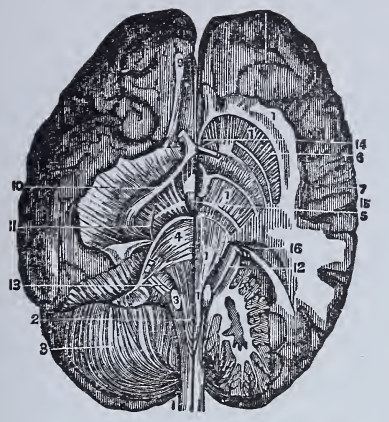


FIG. 1.—View of the course of the front columns of the spinal marrow terminating in the hemispheric ganglions of the brain.

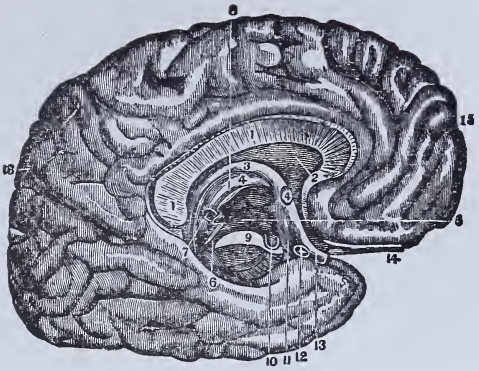


FIG. 2.—Middle vertical section of the callous body. The inner left side of the brain is also seen.

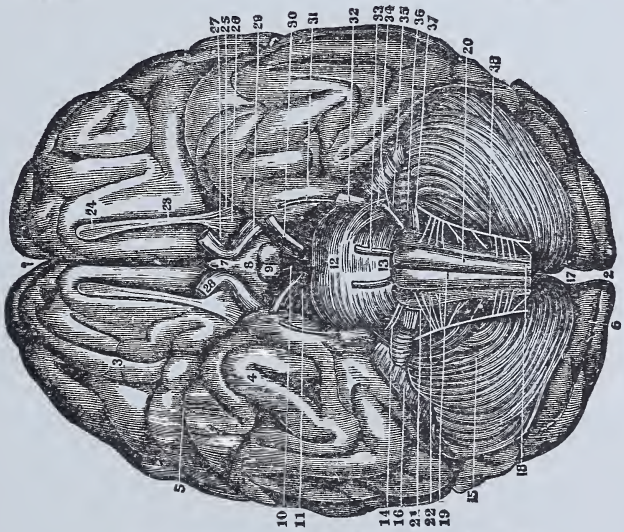


FIG. 3.—View of the base of the brain and cerebellum, together with the nerves.

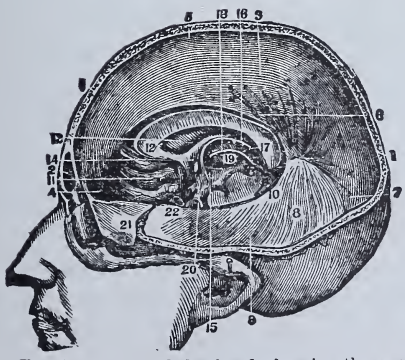


FIG. 4.—Section of the head showing the greater scythe, the horizontal apophysis of the diameter between the brain and the cerebellum and other parts found under the middle line of the head.

FIG. 5.—View of the appearance of the tortuous elevations of one side of the brain, seen from above.

Further Treatment.—Bleeding from the temples, cupping in the nape of the neck, or small general bleedings, repeated from time to time as circumstances may require, may, by diminishing the quantity of the blood, facilitate the circulation of this fluid through the brain. But, perhaps, the greater advantage would be derived by keeping the bowels freely open without inducing excitement or debility, chiefly by means of the neutral salts. The compound aloetic pill will be advantageously employed in those cases in which the disease occurs after the cessation of the catamenia, or suppression of a hemorrhoidal discharge. A diminution of the circulating fluids, as well as their equalization, will be effected likewise by promoting all the secretions, particularly those of the urine and bile.

Diet.—The food and drink of the patient should be particularly attended to. His diet should consist of those kinds of food which are most easily digested, and which afford the greatest quantity of nourishment in the smallest bulk. Ardent spirits, strong wines, fermented liquors, even strong coffee or tea and all stimulants should be avoided as more or less injurious.

Treatment of Second Period.—The treatment of the second period, or that of softening from inflammation, is the same in principle as that of the former, in so far as it regards the state of excitement with which this morbid change is generally accompanied. But if the paralysis be fairly established and, notwithstanding the depletory and sedative measures which have been employed, continues to increase, neither our own observation nor the recorded experience of others would recommend a steady perseverance in the means, the debilitating effects of which have not been sufficient to overcome the inflammatory excitement of the first period. Bleeding and active purgatives should now be laid aside; blisters or sinapism should be applied to the inferior extremities, the nape of the neck and superior part of the spine; the head should be kept cool by the constant application of evaporating lotions; the bowels evacuated once or twice a day by means of a mild aperient, or by injections, the secretion of urine and the cutaneous perspiration should also be promoted by remedies of the least stimulating qualities. The retention of the urine is a complication which must be sedulously watched, that this fluid may be removed before it accumulates to a degree to prove injurious; stimuli or tonics should now be employed with a view to support the strength of the patient, but they ought never to be employed to such an extent as to produce excitement, as the powers of life are already greatly exhausted by the stimulus of the disease.

BRAIN FEVER.

(Cerebral Macula.)

Difficult Diagnosis.—Under this term we propose to include the pathology, symptoms and treatment of the inflammatory affections of the brain and of its membranes. We adopt this plan, not merely because of the intimate relation subsisting between these structures, but because when we trace the history of a number of acute affections of the encephalon and examine the lesions of structure presented after death, we shall frequently find that the substance of the organ, as well as the investing membranes, has been involved in the disease. Hence arises the difficulty of establishing the diagnosis between inflammation of the parenchyma of the brain and that of its membranes.

Symptoms.—When either the arachnoid or pia mater, which closely invest the brain, are extensively inflamed, the functions of this organ become inevitably disturbed by sympathetic irritation, without its parenchyma necessarily partaking of the inflammation, or if the inflammation extends to the parenchyma it is mostly confined to the superficial layer of cortical substance. Hence meningitis, besides headache and intense fever, we have an increase of the general sensibility, preternatural acuteness of the external senses, violent delirium and convulsions, and, finally, collapse, coma and death. Extensive and acute inflammation of the hemispheres of the brain will be characterized by a nearly similar train of symptoms.

Two Classes of Inflammation.—We shall proceed to consider inflammation of the encephalon under two divisions, viz.: 1. Inflammation of the membranes of the brain (meningitis); 2. Inflammation of the substance of the brain (cerebritis).

Inflammation of Brain Membrane.—An examination of the structure of the brain and of the peculiarities of the circulation in it and upon it would lead us to the inference that if the meninges be the seat of inflammation, the contiguous cerebral substance must participate in some degree in the irritative influence. In other organs the vessels, after entering them by trunks and branches of various sizes, branch out and ramify in their interior until they become capillary in their spongy and areolar tissue. But in the brain a different arrangement takes place, the vessels, after entering at the base of the skull, communicate freely with one

another and then branch out upon the surface of the brain, ramifying in an extended web of cellular tissue (pia mater); in this way they become reduced to so great a degree of tenuity before they enter the substance of the organ that it may be said to be surrounded by a vascular atmosphere from which its supplies are derived. Hence it is, that as the meninges and the contiguous cerebral substance are supplied from the same source, each will more or less become affected by any inflammatory action set up in the other.

Sympathetic Symptoms.—Cerebral irritations are divisible into two great classes, symptomatic and idiopathic. Symptomatic irritation is for the most part connected with and dependent as a morbid condition of the chylopoetic viscera. We frequently observe that for weeks previous to the occurrence of pain or any disturbance in the head the digestive functions have been impaired, the bowels confined or irregular and the stools unnatural. In many of these cases, when the headache, retching, irregular fever and even coma have set in, speedy and permanent relief has followed the use of purgatives, and the other means usually resorted to for correcting disordered functions. An irritative influence is in such cases propagated from the digestive organs to the brain by reason of the close sympathetic connection which subsists between them in health and in disease, and that irritation, if kept up for a while, will pass into positive inflammation, marked by its usual consequences. The irritation of worms and of teething may also induce similar results, more particularly in those constitutionally predisposed. We frequently observe these cerebral affections to spring up during the course of other diseases, of which they may be considered as complications, viz.: continued fever, scarlatina, measles, whooping-cough, and they not infrequently follow accidents or injuries.

Varying Symptoms.—This affection presents a train of symptoms which varies in different ages and in different temperaments. Its most marked and ordinary character at its outset is an increased sensibility to all sorts of impressions, the ordinary external influences producing inordinate effects. Thus, a child is restless and sleepless, seldom even dozing, or if he does doze from time to time starting and waking up; he attends to every sound, the eyes are suffused, the retina is so sensitive to light that he winks or turns away if his face is directed to a window or to a light; the pupil is generally contracted but not invariably so. The head is often moved about or from side to side, so are the limbs; the temper is peevish and nothing seems to soothe this irritable condition but motion up and down the room in the arms of the nurse or attendant.

Bowel Symptoms.—The state of the bowels varies much in different instances, they may be confined or relaxed, but the stools do not present any unnatural appearance.

Increased Animation.—There is a minor degree of this state which is marked by increased animation and liveliness, which with ordinary observers may pass for an increase of health and vigor, though an attentive observer will readily perceive that the countenance wants that disengaged air which exists in health, and on making a closer examination he will find that the eyes frequently close and wink and the countenance assumes an expression as of frowning; the hand, too, is frequently raised toward the head, and the fingers are fixedly closed.

Indifference.—We occasionally observe a state the very opposite of this, a state characterized by want of animation, accompanied by plaintive moaning at times, and an indifference to surrounding objects. Though the patient does not sleep, yet his state is not that of waking, and if roused, betrays fretfulness and peevishness. These may be considered as so many indications of an incipient irritation, which in some constitutions may arise independently of any assignable agency, but which in many cases is referrable to an irritation propagated to the brain from the peripheral extremities of the nerves during dentition, or by worms in the alimentary canal, or by vitiated secretions, or a torpid liver.

Fever Symptoms.—The symptoms above indicated are by some denominated fever, some epithet being usually added for the purpose of indicating its source, or its nature; hence the terms gastric, irritative and hydrocephalic fever.

Morbid Excitement.—The most expressive term which we can employ is that of "sensitive erethism," or morbid excitement. It is distinct from inflammation of the brain, of which it is frequently the precursor, and according to individual peculiarities, or other modifying circumstances, it may end in cerebritis, meningitis or that modification of the latter called hydrocephalus, and this termination is but too often unexpected by the practitioner, whose attention has perhaps been directed to secondary indications and minor effects, while the erethismal state of the brain has crept on unheeded. The condition here indicated cannot be supposed to exist unaccompanied by an increased flow of blood through the cerebral vessels, or in other words, an increase in their degree of tension; and as the tension may vary from a slight degree of fullness to the greatest of which the vessels are susceptible, such a state of local determination of blood will soon end in inflammation if not subdued by proper means.

Further Symptoms.—The actual inflammatory attack is generally ushered in by headache more or less violent (the pain being referred to the temples, the vortex or forehead, sometimes to the occiput and base of the skull), by intolerance of light, heavy and suffused eye, with quick pulse, are also attendants; so, in many instances, is vomiting. In those who have suffered much from mental disquiet spasmodic twitchings are sometimes perceived, not unlike those which arise from slight electric sparks. In children and very young persons it frequently commences with a sudden and long-continued convulsion without any previous warning. After a while the convulsive movements cease, a remission takes place, and the patient appears free from complaint for one or more days, when a second attack occurs which may terminate in coma or death.

Changes in Membrane.—After having been the subject of inflammation the membranes present various changes dependent either on the duration and intensity of the attack or on the frequency of its recurrence; but all of them are referrable to the following heads, viz.: simple redness of the arachnoid; thickening and opacity with increased firmness; serous effusion beneath or upon it or into the ventricles; puriform or seropurulent exudations; false membranes; increased vascularity and thickening of the pia mater. We also find lesions consisting of granulations scattered in the meninges over the surface of the brain and in the sylvan fissure, which have been shown by the microscope to be of a tubercular nature.

CHRONIC MENINGITIS.

The Delirium.—Meningitis is in many instances so slow in its progress as to assume the chronic form. We have then delirium and progressive paralysis as constant attendants. The delirium is at first partial, it is a monomania with weakness of intellect, but, after a time it passes on to maniacal excitement and finally subsides into confirmed idiocy. The paralysis in those cases does not exhibit a total privation of sensation and motion in any particular part of the body; it is at first slight, but gradually increases and extends to the whole muscular system, rendering the gait feeble and vacillating and ultimately destroying the power of motion. It is remarkable that the diminution of sensation is not proportioned to that of motion. Spasmodic movements with contraction and rigidity of the limbs sooner or later set in, and, finally, epileptic attacks, which terminate in fatal apoplexy.

The Paralysis.—The paralysis which occurs presents this remarkable

feature, that it seems to shift about from one hour to the other, one day, for instance, the right leg is found to be drawn up with greater energy than the left, when the sole of the right foot is tickled, but on repeating the examination a few days afterward it is the left leg which now feels and moves better than the right. It would seem from this as if the paralysis has shifted from one side to the other, but such is not the case, the limb which was first palsied is still so, but the illusion arises from the circumstance that the palsy has not increased in degree in the first limb, while the second limb has become involved to a great degree. Motor power has not returned in the former, but has been more gravely impaired in the latter.

After-Death Facts.—The lesions which are found after death subsequently account for these facts. When the right limbs alone were paralyzed the brain is found to be disorganized on the left side; but when the paralysis apparently shifted from one side to the other both hemispheres are found diseased, but more deeply and more extensively on the opposite side to that of the limbs which were most palsied. This apparent mobility of paralytic symptoms more frequently occurs in meningitis than in any other complaint.

Causes.—Meningitis is a frequent consequence of injuries of the head, of fractures, concussion or even wounds of the scalp. It not infrequently happens that a wound of the head heals rapidly and that the patient returns to his usual occupation thinking himself quite well, but after ten or fourteen days he begins to feel pain in the situation of the wound which gradually increases in intensity, and in a very short time all the symptoms of cerebral inflammation become manifest. A child may suffer serious injury from a fall, and as all mention of the accident is suppressed by his immediate attendant, it escapes the notice of others and no ill effects follow perhaps for a week or two; the child then, however, loses appetite, becomes restless and irritable, febrile excitement, delirium and convulsions succeed and too often are the precursors of a fatal termination.

INFLAMMATION OF BRAIN SUBSTANCE (Cerebritis).

Symptoms.—The most usual premonitory symptoms are a general uneasiness and restlessness with a tendency to congestion in the head; a sense of weight and fullness; occasional attacks of pain in the head, or of temporary apoplexy or epilepsy; flushing of the face and increased heat of the head; drowsiness and vertigo; preternatural acuteness of the ex-

ternal senses; intolerance of light and optical illusions; contraction of the pupils, strabismus or imperfection of sight; tinnitus aurium or various other noises in the ear; confusion of thought; failure of the memory; mental excitement or depression, or some striking alteration in the habitual character and pursuits of the individual.

Additional Symptoms.—In some cases there is little appearance of indisposition throughout the day, but the symptoms are aggravated at night; the sleep is uneasy or disturbed by alarming dreams, and in children there is often grinding of the teeth. Pains in the limbs and frequent cramps, general lassitude and muscular debility are often felt, alternating with fits of shivering and feverishness; the digestive functions are disordered; there is a general loss of appetite; often obstinate vomiting; the bowels are either irritable or torpid, the secretions being always unhealthy.

Symptoms Following Inflammation.—The above symptoms precede either general or partial inflammation of the brain. Those which follow indicate more especially the invasion of partial and chronic inflammation, a long-continued, fixed and deep-seated pain in one part of the head; pain, numbness, weakness, a sensation of creeping and tingling in one extremity or in one-half of the body, or confined to one portion of the extremity; there may be numbness and loss of power in one finger only or in one set of muscles. Sometimes the speech is affected so as to produce a degree of hesitation, stuttering or indistinctness of pronunciation, drowsiness, languor, depression of spirits are observed, also more particularly in the chronic form of cerebritis. Some of these premonitory symptoms may have been present for weeks, for months, or even for a year, or for a longer period.

General Cerebritis.—General cerebritis is always acute. Its symptoms are divisible into two periods, viz.: 1. The period of irritation or excitement. 2. The period of collapse.

Symptoms.—The symptoms which characterize the period of excitement are intense pain extending over the greater part of the head; great excitement of the cerebral functions; violent delirium; preternatural acuteness, of both the external and internal senses; intolerance of light; brightness, redness, wildness or protrusion of the eyes; contraction of the pupils; tinnitus aurium; flushing of the face; throbbing of the temporal arteries; paroxysms of general convulsion; rigidity of some of the muscles on one or both sides of the body in the interval of the paroxysms. There are also severe shooting pains in the extremities, greatly increased

by extending them; twitching of the muscles of the face; rolling of the eyes; quick, suspicious and irregular breathing; rapid, full and hard pulse; subsultus tendinum; red and dry tongue, either tremulous when protruded or in violent motion, pushing out the cheek or forcibly thrust out of the mouth; great thirst; occasionally severe vomiting, especially in children; scanty and high-colored urine. The paroxysms of convulsion are always attended with an exacerbation of the symptoms. The respiration is hurried, and the pulse rises suddenly, forty or fifty beats in a minute. When the convulsions subside the pulse and respiration become comparatively slow and feeble.

Further Symptoms.—The symptoms just enumerated may last from twelve to forty-eight hours or more, when they are succeeded by others of an opposite character, which constitute the second period or that of collapse. The headache is now no longer complained of; delirium gradually passes into stupor or coma; the preternatural acuteness of the senses is succeeded by obtuseness and insensibility; the convulsions subside into general muscular relaxation and more or less complete paralysis succeeds. The pupils become dilated and motionless; the eyes sunk, pale and dim; there is sometimes strabismus or deafness; the pulse is rapid, small, unequal or intermittent; there are frequent rigors, the skin afterward feeling cold and covered with a clammy sweat; the face is pale, sunk and cadaverous; the respiration is slow or irregular and stertorous. When the patient lies senseless on his back and swallows with difficulty, the fatal issue is not far distant. There may be several alternate paroxysms of excitement and collapse until the patient finally sinks into a state of coma which soon ends in death.

Diagnosis.—When the inflammation occupies at the onset a large portion of the brain, it is generally complicated with meningitis and characterized by disturbance in all the vital functions.

Course of the Disease.—When, however, a smaller portion of the brain is engaged in inflammation the course of the disease is seldom so rapid; its invasion is more gradual and preceded by symptoms of irritation in some of the organs of voluntary motion, sensation or intelligence. Convulsive rigidity and retraction of the muscles are sometimes observed in connection with meningitis; but it may be generally distinguished from spasmodic paralysis by several well-marked signs. There is no actual paralysis, and when the convulsive retraction intermits the patient fully recovers the power of voluntary motion in the same manner as after the paroxysms of spasmodic rigidity in tetanus. This convulsive rigidity is

scarcely ever limited to one region or to one side of the body as in partial cerebritis, but affects a variety of parts at the same time on both sides.

Treatment.—The inflammatory nature of the more acute forms of cerebritis and arachnitis is so obvious that their treatment has always been conducted in correct principles. Until very lately, however, the inflammatory character of partial and chronic cerebritis was either entirely overlooked or imperfectly understood, that though active treatment was sometimes adopted at the beginning of the disease it was soon laid aside, and remedies of an opposite description substituted. These affections were in fact generally set down as nervous, mistaken for rheumatism, neuralgia, nervous dyspepsia and debility or nervous palsy, and treated by tonics, electricity and stimulants; the fatal termination of the disease being thus accelerated.

Preventive Treatment.—Cerebritis and arachnitis are so formidable that their prevention is of no less, if not greater importance, than their treatment. It is extremely important to have recourse to active measures on the very first appearance of any of the premonitory symptoms, however trifling; as we may thus succeed in effectually removing that state of congestion and irritation of the brain, which is the precursor of inflammation. The means of accomplishing this are the careful and timely removal of all the exciting causes; of every source of irritation, both bodily and mental; regulation of the diet; avoiding all excesses; relaxation from study; change of air; general and local blood letting, counter-irritation, with occasional purgatives.

Vigilance Required.—Great vigilance is particularly required in the cerebral affections of infants and children who frequently suffer without complaining. A predisposition to affection of the brain may often be suspected by some slight cast or rolling of the eyes; by dilatation of the pupils, or occasional startings or attacks of spasmodic croupy breathing during sleep; there may be every other appearance of perfect health with these symptoms, which are often only evanescent.

Relieving Congestion.—When it is necessary to relieve the brain from habitual congestion by occasional topical bleeding, the method of taking blood from parts as remote from the disease as possible seems to us preferable to that of abstracting blood from the head itself. When the vessels of a part are partially emptied of their blood, if they have been much weakened by long-continued over-distension or previous disease, so as to have lost their elasticity, there will be an immediate flow of fresh blood to the part; this will take place on mere hydrostatic principles.

Uses of Bleeding.—No fact is better established than that the loss of an exceedingly small quantity of blood from certain parts of the body is sufficient to relieve distressing symptoms of congestion and oppression in others most remote from them; as, for instance, a very slight discharge of blood (one or two ounces) from the hemorrhoidal veins being sufficient instantly to remove vertigo, flushing, earache or oppressed breathing; the same is the case in a still more striking manner with the catamenia, although some account must be taken of the influence of uterine irritation over the system. We prefer, therefore, in cases of habitual congestion in the brain, taking blood occasionally from the feet or legs, by opening a vein or applying leeches and letting them bleed in a foot-bath; or the application of leeches to the arms whenever practicable. We have found this the surest method of affording permanent relief, and by repeating it at certain intervals the tendency to cerebral congestion may be completely overcome. We have pursued this plan in lunatics with the very best results.

Cooling the Head.—The insertion of an issue is often advisable as a preventive in people of a plethoric habit. The head should be kept cool by the frequent use of cold ablutions, the hair cut short, the head and shoulders raised at night; tight bandages round the neck must be avoided; the daily use of the cold shower bath is often very beneficial, but a reaction takes place in the head unless it be used with the feet immersed in hot water. The feet, legs and lower parts of the body ought to be carefully kept warm and dry.

Further Treatment.—In the treatment of cerebritis, when fully developed, attention must be paid to its two periods of excitement and collapse. The remedies chiefly to be relied upon are blood letting, general and topical purgatives, cold applications to the head and counter-irritation.

Treatment of More Acute Cases.—In the more acute cases the patient must be freely bled from a large orifice. If the symptoms continue unabated the bleeding must, however, be repeated several times, at intervals of a few hours, and this practice must be carried during the first period of the disease to the utmost limit of the patient's strength. It often happens that very little impression is made on the disease by the first bleeding and no amendment takes place until after the second. The symptoms often abate after bleeding, but a fresh exacerbation may take place in the course of a few hours. Topical bleeding, by cupping or leeches, is, under such circumstances, highly beneficial.

Head Treatment.—The head must be shaved, and pounded ice mixed

with cold water and vinegar may be applied to the scalp. A very effectual method of applying cold is by making the patient hold his head over a basin and pouring a stream of cold water on it from a certain height; this often removes the heat and flushing and calms the excitement; it should be repeated as often as the heat and flushing return. The application of cold to the body is always followed by a reaction, and the temporary relief refrigerants afford will be succeeded by an increase of the inflammatory symptoms and their use become decidedly injurious unless their depressing action be kept up by a steady and repeated application.

Other Remedies.—The remedies next to bleeding and cold, and often not less efficacious, are active purgatives, which must be administered at short intervals until copious evacuations be procured. In some cases no marked amendment has taken place until the bowels have been freely moved; they are sometimes exceedingly torpid, for reasons which have already been assigned, and large doses of cathartics may be required. Combinations of calomel, jalap, scammony, followed by any of the purgative mineral waters, are the purgatives on which the most reliance can be placed. Croton oil is sometimes a valuable remedy, from the facility of its administration and certainty of its effects. Mercury may be given freely as a purgative.

Use of an Emetic.—We have sometimes found tartar emetic of great service when there was no irritability of stomach to prevent its being tolerated; the power of tartar emetic in controlling the action of the heart and subsiding the inflammatory diathesis is now fully established; a solution in the proportion of one grain to the ounce and a tablespoonful given every hour or two, suspending it should vomiting occur, has often been attended with great benefit. The remedy is in general well tolerated, owing to the torpor of the stomach; violent vomiting should, however, be prevented, as it would obviously be extremely injurious.

Treatment of Second Stages.—In the second stage of acute cerebritis, that of collapse and coma, general blood letting is to be used most sparingly; decided advantage, however, has resulted from a moderate bleeding even at a late period. In this stage topical bleeding is more generally indicated. There are periods of exacerbation in the symptoms which should be watched and overcome by these means, which may be persevered in as long as there is any hardness and resistance in the pulse. We have seen a patient instantly recover from a state of profound coma by the abstraction of a very small quantity of blood with the cupping glass. In this stage we may have recourse to counter-irritation with advantage;

blisters may be applied between the shoulders, to the occiput or to the neck or legs. There is an objection to their being applied to the whole head, that it prevents the subsequent application of cold. We have, however, in desperate cases, seen a decided amendment follow the application of a large cap blister. Particular attention should be paid to the abdominal region, and especially that of the bladder, which ought to be examined morning and evening in order to detect retention of urine, and we must take care not to be led into error by an incontinence of urine from the over-distension of the bladder; this must be obviated by drawing off the urine with the catheter twice a day.

Treatment of Chronic Forms.—In the more chronic forms of cerebritis, unattended with fever or much general excitement, the same activity of treatment is of course not admissible. We must still, however, pursue the antiphlogistic plan, modifying it according to the urgency of the symptoms. During the period of irritation, with cephalgia, vertigo, or rigid spasm of the extremities, moderate bleeding, general and topical, purgatives and counter-irritation are the only remedies from which any advantage is to be expected; they must be repeated at longer or shorter intervals, according as the strength of the patient and the continuance of the symptoms may seem to indicate. A great deal is to be accomplished in all chronic inflammations by persevering in a moderate course of antiphlogistic treatment. We must watch carefully any signs of amendment, remembering that there is a great tendency to collapse, and that the natural course of the complaint is characterized by irregular remissions and exacerbations.

When to Cease Active Treatment.—When the period of irritation is over, and is followed by a remission of all signs of excitement, by a complete paralysis of the muscles, and by other evident signs belonging to the period of softening and suppuration, the strength of the patient must no longer be reduced by active treatment. In all inflammatory diseases, when the stage of excitement and disorganization is over, a process of reparation commences, which requires for its completion a certain degree of power in the constitution. If at this period we persevere in lowering the general strength, we deprive the constitution of its natural resources and interfere with its healing operations.

When the Excitement Turns.—It becomes, therefore, an object of considerable importance to watch the moment when the tide of excitement is on the turn, and when the powers of the constitution are verging to a state of collapse, in order that we may abstain from an injurious interference, husband the patient's strength and even support it if required.

This precaution is particularly necessary in old people and young children.

Convalescence.—After convalescence has been established the patient will still require to be closely watched for some time before his recovery can be considered fully confirmed; he must be kept perfectly quiet, free from every species of excitement and the regimen duly regulated. When the brain has once suffered from inflammation it is slow in recovering its tone, and the most trifling cause, such as a slight mental exertion or emotion, a full meal, and so forth, has been in many cases sufficient to occasion a relapse.

Suppressed Menstruation.—When cerebritis has occurred after suppressed evacuations or the metastasis of other diseases, we should endeavor to procure their return. If menstruation is suppressed, leeches should be applied to the pubis or inguinal regions, and the frequent use of hot pediluvia recommended. If cutaneous eruptions or rheumatic gouty pains in the joints previously existed, blisters or rubefacients are to be applied to the parts originally affected.

Summary of Symptoms of Brain Congestion.—The following summary gives a connected view of the various morbid conditions of the brain, which are the effects of congestion and inflammation, together with their symptoms:

Cerebral Congestion.—Cerebral congestion, over-distension of vessels; vertigo, tinnitus aurium, confusion of sight, cephalgia, if the pressure in the vessels be carried to a sufficient extent to intercept the circulation; simple apoplexy, seldom fatal, recovery rapid.

Permanent Cerebral Congestion.—If the cerebral congestion be permanent, or returns frequently; drowsiness, oppressed intellect; the vessels become weakened and on a sudden increase of congestion are ruptured; extravasation of blood, sanguineous apoplexy; destruction of cerebral substance and compression; loss of consciousness, permanent or temporary; sudden and complete paralysis without spasmodic affection of the muscles.

General Congestion.—General congestion, followed by inflammation of a considerable portion of the brain; deep injection; partial sanguineous infiltration; dotted and ecchymosed striated appearance of the cerebral substance; general cerebritis (combined usually with arachnitis). Period of high excitement of all the cerebral functions, with general convulsions, followed by a period of collapse and coma.

Partial Congestion.—Partial congestion and inflammation of the brain; 1st period, the same deep injection and sanguineous infiltration,

more circumscribed; partial cerebritis. Partial symptoms of irritation in the organs of motion and sense; weakness, pain, numbness, spasmodic paralysis, confined to one side or a few regions of the body. 2d period, infiltration of pus in the cerebral substance; softening; abscess; complete paralysis; relaxation and flaccidity of the muscles; loss of feeling; abolition of some of the external senses or intellectual faculties; death, either gradual or sudden, by the extension of the inflammation or by pressure.

Cerebral Inflammation.—After sanguineous apoplexy and sudden and complete paralysis, inflammation of the cerebral substance surrounding the coagulum; consecutive cerebritis, the paralyzed limbs affected with pains, convulsive motion, spasmodic rigidity.

Slow Congestion.—Slow and gradual congestion with very slight irritation; long, continued state of low inflammation, ending sometimes in softening, sometimes in induration, or else in an infiltration of serous fluids and white softening. Various forms of chronic cerebritis, sense and motion very gradually weakened and impaired without pains or spasmodic rigidity in the muscles.

DROPSY OF BRAIN.

(*Hydrocephalus.*)

Causes.—Water in the head; dropsy of the brain. This is almost always an affection of early life. Sometimes it is congenital. It is mostly a passive dropsical effusion; certain cases show signs of a chronic or subacute inflammatory condition of the arachnoid membrane of the brain.

Symptoms.—Languor, strabismus, convulsions, loss of appetite and increase in the size of the head. This last may be enormous.

Treatment.—Moderate purging every few days, or once a week, sustaining the strength by nourishing food, and, if it be borne, cod-liver oil; diuretics; shaving the head and rubbing it nightly with mercurial ointment; occasionally blistering the back of the neck, in a child. Pneumatic aspiration may perhaps prove useful in hydrocephalus. To remove the fluid gradually and safely mild stimulating baths have a very beneficial influence.

INFLAMMATION OF THE SPINAL MARROW, MYELITIS, SPINAL MENINGITIS.

Symptoms.—The symptoms of this uncommon affection are: constant and severe pain in the back increased by motion; spasmodic contractions

or rigidity of the muscles followed by paralysis, fever, constipation of the bowels and retention of urine. In myelitis proper, as distinguished from spinal arachnitis, there is no pain or muscular rigidity but only paralysis of motion and sensation.

Treatment.—Cupping or leeching along the spine, followed by a blister and active purgation with saline cathartics, constitute the essential parts of the treatment of simple inflammation of the spinal cord or of its membranes.

APOPLEXY.

Causes.—These have been divided into external or obvious, and internal or such as can only be discovered after death. The external causes or those acting mechanically by evoking pressure on the brain; such are fracture of the skull with depression of a portion of bone, or blood extravasated immediately beneath the fractured bone without depression. The reality of this cause is shown by the effect of direct pressure made upon the surface of the brain by the point of the finger in cases where a portion of the skull has been removed by the trepan, or on the fontanelle or opening between the cranial bones in the head of infants. Causes tending to increase the arterial action of the brain, either by direct application to the head itself, or indirectly through the medium of other organs. Causes which operate by impeding the return of blood from the brain, as stooping; the application of a tight ligature round the neck so as to compress the internal jugular veins; tumors of any kind so situated in the neck or chest as to interrupt the return of blood from the brain to the heart; diseases of the heart or lungs impeding the transmission of the blood through the pulmonary vessels; or a voluntary suspension of breathing after a full inspiration; or in blowing wind instruments, or in making great muscular efforts of any kind. The internal causes are those that are only discoverable after death, viz.: extravasation of blood in the substance of the brain or in the ventricles, or serous accumulations in any of the cavities or between its membranes.

Symptoms.—We have two forms of genuine apoplectic seizure: congestive and hemorrhagic. In the first the premonitory symptoms are, carotids, distension of the temporal arteries and jugular veins; constipation, languor, dullness, drowsiness, dimness of sight, vertigo, headache. The attack is marked by sudden stupor; with slow and sometimes snoring respiration, full and slow pulse, dusky or turgid appearance of the face. The total loss of perception may be brief, its partial absence or deficiency

continuing for some time. Slight convulsive movements are not uncommon. Paralysis of the muscles occurs only for a short time after the attack, if recovered from.

Hemorrhagic Apoplexy.—In hemorrhagic apoplexy generally no clear premonition is given, the attack being very sudden; a stroke, literally unconsciousness is complete for some seconds, minutes or hours. After this, general or local paralysis, most often hemiplegia (paralysis of one side of the body) is left; the mental powers also, in many cases, being impaired at least temporarily, during the coma; the breathing is commonly stertorous and the pulse slow and somewhat full, the head hot and the face more or less dark or flushed. But the fullness of the blood-vessels and heat of the head are much less, as a rule, than in congestive apoplexy.

The younger the patient and the more vigorous his antecedent health the more probable is the existence of the congestive form; and, also, the better the prospect of recovery from hemorrhage within the cranium, if only the effects of pressure be exerted at the time.

Treatment.—1. If, in a person under fifty, not before of broken constitution, we find the head hot, face turgid and flushed, the arteries and veins of the neck and temples full, the pulse also strong, and the heart's impulse so (or the heart's action vigorous though the pulse at the wrist be oppressed) blood may be taken, carefully, from the arm or by cups or leeches applied to the back of the neck.

2. Older and more doubtful cases may be treated tentatively with cups alone, aided by mustard plasters to the legs, back and epigastrum in turn; with laxative injections into the rectum during the attack and saline purgatives afterward. The head should be kept raised and cooled with wet cloths until its temperature becomes normal. If the hair be thick, it should be cut very short or shaved off entirely and an ice-cap placed thereon over the whole surface. When, however, there is reason, as usually is the case in really old or broken-down patients, to believe the structural degeneration, arterial or that of ramollissement, is the source of the attack, loss of blood will be out of place. Iodide of potassium for some time will aid absorption.

LOSS OF SPEECH.

(*Aphasia.*)

Symptoms.—Loss of speech may occur as one of the symptoms of disease of the brain, either functional and transient, or organic and irre-

THE NERVES

FIGURE No. 1.

1. Plexus or bunch of nerves in the carotid region.
2. Sixth external motor nerve.
3. First branch of the 5th ophthalmic nerve.
4. A branch on the nose partition, which goes to the incisive *foramen*.
5. Concurrent branch of the *Vidian* nerve, dividing itself into carotid and petrosas branches.
6. Back branches of the palate.
7. Lingual nerve joined by the tympanum cord.
8. Hard part of the 7th pair or facial nerve.
9. Upper cervical ganglions.
10. Middle cervical ganglions.
11. Lower cervical ganglions.
12. Roots of the great splenic nerve.
13. Lesser splenic nerve.
14. Renal plexus.
15. Solar plexus.
16. Mesenteric plexus.
17. Lumbar ganglions.
18. Sacrum ganglions.
19. Vesical plexus.
20. Rectum plexus.
21. Lumbar plexus.
22. The rectum.
23. The bladder.
24. The pubis.
25. Crest of the ileum.
26. The kidney.
27. The aorta.
28. The diaphragm.
29. The heart.
30. The larynx.
31. The submaxillar gland.
32. The incisive teeth.
33. The nasal partition.
34. Globe of the eye.

35, 36. Cavity of the cranium.

FIGURE No. 2.

1. Section of the bone of the forehead.
2. Section of the occipital bone.
3. Muscles in the back of the neck.
4. Integuments on the skin.
5. Frontal cavity.
6. Middle spongy bone.
7. Lower spongy bone.
8. Middle passage of the nose.
9. Lower passage of the nose.
10. Thickness of the roof of the mouth and depth of the nose.
11. Opening of the eustachian tube. The catheter is at the nose and is going through the tube.
12. Cartilage of the nasal division.
13. *Genio-gloso* muscle.
14. Veil of the palate.

FIGURE No. 4.

1,1. The cubital nerve.

2,2. The ramus profundis dorsalis (deep-seated nerve of back of arm).

3. Extreme of the cutaneous nerve of the arm.
4. Branch of the radial nerve.

5,5. Back view of the digital nerves, or of the fingers.

6. Back branch of the cubital nerve.

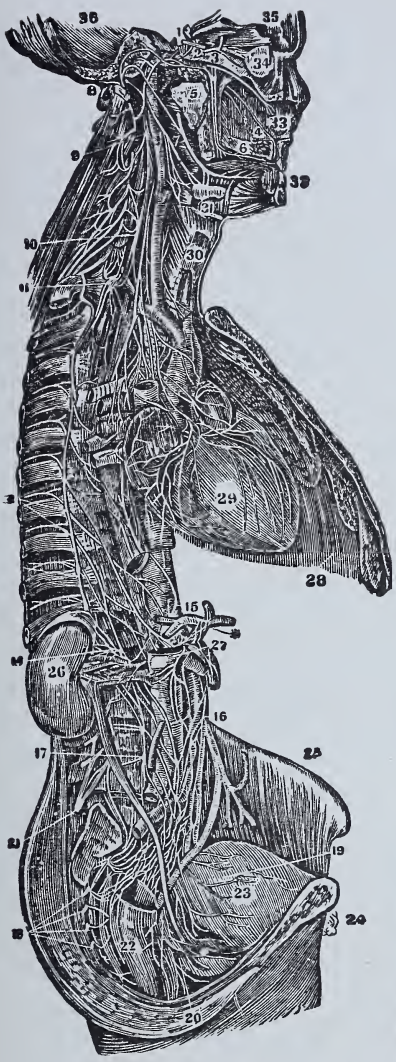


FIG. 1.—The great sympathetic nerve

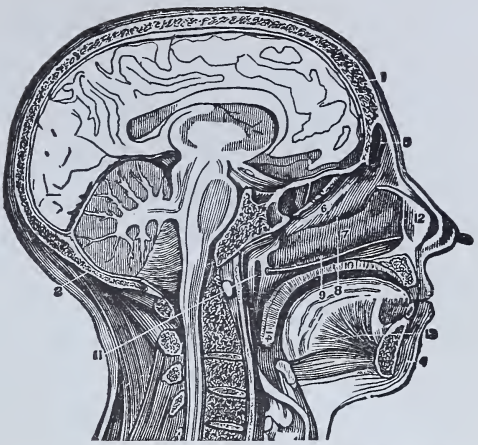


FIG. 2.—Vertical middle section of head and neck, showing the opening through the eustachian tube, and its relations with the pharynx.

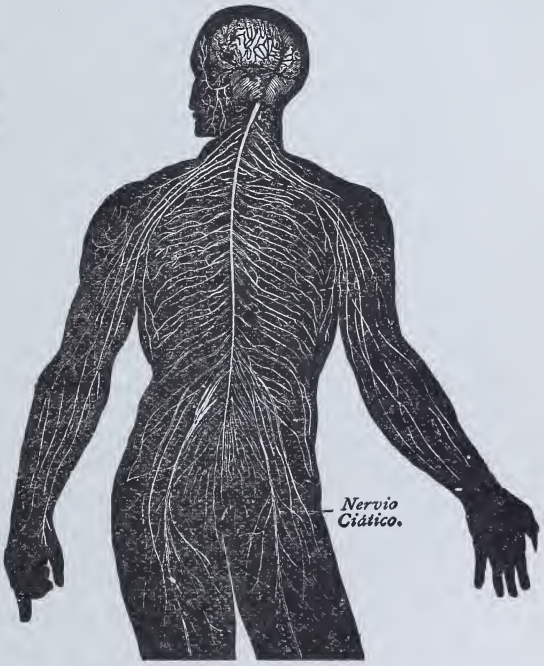


FIG. 3.—View of the nervous system in man, showing the nervous centres (the brain and the spinal near row) whence start the other nerves which provide the whole body.

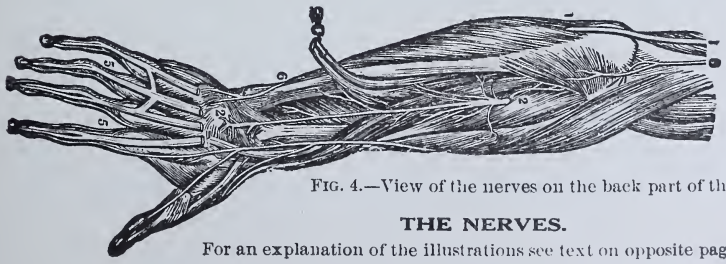


FIG. 4.—View of the nerves on the back part of the forearm and hand.

THE NERVES.

For an explanation of the illustrations see text on opposite page.

movable. Such a loss of language is termed aphasia, not articulation, as in aphonia, but expression is, in this affection, wanting. The power to unite words from memory, to convey meaning, is lost; but, in some cases, at least, they may be copied correctly.

Causes.—Hemiplegia of the right side has in a number of examples coincided with aphasia, and, several times, also, autopsy has shown softening or other lesion of the left anterior portion of the cerebrum. Valvular lesion of the heart sometimes accompanies this disease.

Treatment.—Cases of aphasia are very rare. There is no special measure of treatment except that of general principles, and treat untoward ones as they arise.

SUN STROKE.

Symptoms.—This is a disease occurring in persons exposed to excessive heat and characterized by vertigo, sometimes with violent pain in the head, gradual increase of listlessness and torpidity and a desire to lie down. The feverish symptoms may culminate in more or less sudden and complete insensibility.

Treatment.—The most obvious demand in regard to treatment is to abstract the excessive heat from the body as rapidly as possible, and this can be most speedily accomplished by cold sponging, rubbing the head, neck and chest with ice or by the cold pack. Light should be excluded from the patient as far as possible, and if the pulse is feeble stimulants should be given by the mouth or by injection. If prompt improvement does not occur the hair should be cut short and a blister applied to the nape of the neck.

Heat Exhaustion.—In heat exhaustion the patient is generally found with a cool skin, a feeble pulse and pallid face, without disturbance of the intellect. In such a condition stimulants, dry heat of hot-water bags or bottles, mustard plasters to the stomach and perfect rest and quiet are indicated.

HYPERTROPHY AND ATROPHY OF THE BRAIN.

Meaning.—Hypertrophy means an actual enlargement or overgrowth of the brain structure generally, while atrophy signifies a general wasting of the substance of the brain.

Causes.—The brain is sometimes the seat of morbid growths, including cancers, fibroid and bony tumors, tubercular deposit in large masses,

and casts containing parasites. All these affections are, fortunately, very seldom met with.

Treatment.—The treatment in such cases is, of course, to cut out the tumor and the affected portion of the nerve with as little delay as possible, whenever it can be accomplished.

PARALYSIS OR PALSY.

Causes.—Palsy is one of the most common and most distressing misfortunes which mankind is obliged to suffer. Yet its various forms are rather symptoms of deep-seated disease than disease themselves. Thus palsy of a limb is very frequently a symptom of structural disease of the brain or spinal cord, but it occasionally occurs from a diseased nerve trunk itself. It may affect a whole limb or only part of one, and is sometimes limited to a group of muscles in a particular region.

Symptoms.—The following conditions give rise to paralysis of motion:

1. Disease or injury to a nerve in some part of its course, destroying its power of transmitting the force, which is expressed by a contraction of the muscle to which the nerve is distributed.

2. A disease of some portion of those central parts of the nervous system, whence the nerve takes its origin, or with which it may be connected directly or indirectly.

Varieties of Palsy.—There are many varieties of palsy, among the most important of which are the following:

According to its nature it may be motor (acinesia), and sensory paralysis (anesthesia).

Facial Palsy.—This is an affection of the portio dura of the seventh pair of cephalic nerves, the motor nerve of the face. It occurs at any age, usually from rheumatoid inflammation of the sheath of the nerve at its escape through the cranium, through the stylo-mastoid foramen.

Symptoms.—One side of the face is without change of expression, and the eye on that side is not closed (in severe cases) from the paralysis effecting the orbicularis palpebra muscle. The tongue is not affected in the movements. The facial motor nerve is not often involved in the much more serious cases of cerebral palsy.

Diagnosis.—Absence of disturbance or of incompleteness of control over the tongue, while the power over the eyelid is partly or wholly lost with the absence of severe cerebral symptoms, will, especially in a young person, make the diagnosis easy as well as important.

Treatment.—The treatment of this form of local palsy may be by repeated small blisters behind the ear, followed, when convalescence has begun, by some warm covering (cotton wadding, flannel or silk) to protect the part from cold.

Writer's Cramp.—Pressure upon a nerve may cause its paralysis, generally temporary. A man has been known to have his hand rendered powerless for three weeks by sleeping all night with his arm bent under his head. Friction, the endermic application of strychnia and galvanism may be used in such a case. Writer's cramp or scrivener's palsy, is the result of exhaustion of certain muscles from over-use. Its cure is rest.

Hemiplegia.—This means half palsy and is a paralysis in which one lateral half or side of the body is stricken with powerlessness so accurately that it is customary to define the condition by the terms right and left.

Causes.—Brain lesion is most often the cause of this affection; either an apoplectic clot, a tumor or softening.

Symptoms.—In severe cases the arm and leg may be equally motionless, but if there is any difference between them the leg is generally the limb less affected, the last to be attacked, and the first to recover some of its powers. Suddenly, almost always, but not always with loss of consciousness, the patient loses the power of motion and more or less sensation on one side. In complete cases the parts involved are the arm and leg, the muscles of mastication and half the tongue.

Treatment.—1. Essentially the same principles are applicable to this as have been mentioned in connection with apoplexy. The younger the patient the more vigorous his or her previous health, and the fuller the circulation the more appropriate may be the general or local abstraction of blood to diminish pressure upon the brain. Where softening is apprehended bleeding should be exceptional and cautious. Rest, regulation of the bowels, and counter-irritation of dry cups to the upper part of the spine, and afterward a blister, with friction, as with brandy and red pepper, or whiskey and hot water, or salt and spirits, to the affected limbs.

2. In the hysterical form, if it lasts long, electricity may be applied locally with safety and advantage. In any curable case passive exercise of the weak limbs will be very useful.

Paraplegia.—Paraplegia is that form of palsy in which one-half of the body below the chest and including the lower limbs is stricken with the disease.

Causes.—Spinal disease or injury is its source, with or without cere-

bral implication or complication. It may come suddenly or gradually; generally its beginning, at least, is sudden.

Symptoms.—When the spine is affected, as well as in the reflex form, numbness in the feet and pain in the back are apt to be early signs. The power of motion is lessened or lost in the lower limbs. The muscles may be either relaxed or contracted. The lesion of the spinal marrow, if progressive, is productive of loss of power over the bladder and bowels. Bed-sores with deep ulceration and sloughing may occur in protracted cases.

Treatment.—When myelitis is believed to exist, at an early stage, local depletion to a moderate extent may be advised. In many cases counter-irritation by repeated sinapisms, or stimulating liniments will be proper. While inflammation or active irritation of the spinal cord is made apparent by the symptoms (pain, cramps, muscular twitching or rigidity), strychnia is not suitable. After these have subsided it may be given, not more at first than the thirtieth of a grain twice daily. If it produce jerking movements of the hands or feet, or nervous restlessness, or any marked uneasiness it should be suspended. Electricity may be used with similar caution in a secondary stage of paraplegia.

Hysterical Paralysis.—In females this is among the many forms of functional disorder which that strange but not yet clearly defined disorder, hysteria, may produce.

Diagnosis.—The affected limb, in walking, is dragged after the other, as if a dead weight; while in cerebral hemiplegia the palsied leg and foot are brought round in a curve, the body being bent toward the sound side at the time.

Treatment.—Tonics, good nourishment and change of air are most required in all hysterical cases. For the paralysis itself electricity is useful. Mild shocks for a few minutes twice a day may be given with advantage.

Reflex Paralysis—Causes.—Worms, dysentery, diarrhœa, uterine irritation, teething and external injuries are all thought to induce reflex paralysis in certain instances. Diphtheritic and scarlatinal palsies have been placed in the same category. The simplest and clearest cases are those of wounds.

Treatment.—In true reflex paralysis the removal of the irritant cause produces instant relief. When the nature of the case does not admit of such prompt relief, if the diagnosis be clear, the same indication remains, to address our remedial measures to the seat or source of peripheral

irritation. Palliate, if we cannot cure the trouble there, and we will obtain palliation, if not relief, of the reflex disability. Electricity has proved signally useful in the subsequent treatment.

Diphtheritic Paralysis.—After the termination of an attack of diphtheria, commonly within three weeks, the muscles used in swallowing and speaking, less often those of the upper and lower limbs and the sense of sight may be partially paralyzed. Loss of sensibility usually accompanies the loss of motor power. This condition of things may last for weeks or even months, but is generally recovered from.

Causes.—The immediate cause of the paralysis of the peripheral lesion of the nervous terminations is the toxemic influence upon those centres of the morbid poison of diphtheria.

Treatment.—Passive exercise, stimulating friction and electricity, change of air and sea-bathing are suitable measures for this affection.

Syphilitic Paralysis.—The most unequivocal instances of this nature are accounted for by periostitis within the cranium, involving the dura mater, or by nodular exostosis pressing upon the brain. The most remarkable fact connected with such cases is the prompt curative effect upon it of iodide of potassium.

Lead Palsy.—Considerable time of exposure to the influence of lead is generally necessary to cause this. So commonly does it first affect the extensor muscles of the forearm that the cognomen of "wrist drop" is often applied to it. When it lasts for some weeks the muscles waste away.

Symptoms.—A blue line is observed to form along the edge of the gums. Pain precedes the palsy and attends recovery of power. Mostly, though after a long time, lead palsy is recovered from.

Treatment.—Iodide of potassium appears to act as an eliminant of the lead accumulated in the system. Ergot is also useful. Faradic electricity has been found decidedly beneficial used in moderate strength for a few minutes two or three times a day.

Mercurial Palsy.—This is occasionally met with in those who work in metal. Mostly tremor is a predominant symptom. Early withdrawal from the influence of the cause and the continued use of the iodide of potassium are the principal measures of treatment.

Paralysis Agitans, called also shaking palsy, is described as a more or less constant involuntary and uncontrollable shaking of the hands, arms, head or, progressively, of the whole body. Slight or moderate degrees of such tremor are common enough from general nervous debility. Extreme

cases evince the wreck of the cerebro-spinal system and are, therefore, incurable. In other cases the treatment is upon general principles.

Progressive Muscular Atrophy.—This is still another uncommon and incurable form of paralysis due to a gradual decay and wasting of the muscles, but commencing sometimes with an apparent enlargement or hypertrophy of these organs.

Locomotor Ataxia.—This results from a disease called sclerosis, or hardening of certain motor-centres in the brain and spinal cord, or syphilis.

Symptoms.—Rheumatoid pains precede loss of power, occasional strabismus (cross-eye) and incontinence of urine may occur. Then there is an awkward, unsteady gait; the sensibility of the feet becomes blunted, and walking is insecure. If the patient shuts his eyes he falls down, and even with them open he reels as if drunk. The duration of this progressive disease varies from six months to ten or twenty years.

Treatment.—Hygienic management, general tonics, electricity and very careful use of strychnia.

Infantile Paralysis.—This is a variety developed in very young children and occasionally present from time of birth. As a rule this palsy arises from disease of the spinal cord and its membranes.

Symptoms.—It comes on with acute symptoms of fever and convulsions, ending in paralysis of one or more limbs. In some cases the child gradually recovers from the effects of the malady, but in many the impairment is permanent and the limb, ceasing to develop in proportion to the rest of the body, appears in the adult as if shrunken and withered, constituting a lamentable and hopeless deformity.

Treatment.—Much can be done towards preventing complete loss of power by persevering and systematic movements, application of galvanism and exercise as suggested in the article on hemiplegia.

Scrivener's Palsy.—Called also writer's cramp. It is the result of long continued and unnatural excitement of the nerves controlling the fingers and hand in writing.

Symptoms.—The earliest indication is a painful sense of fatigue and weakness which comes on shortly after commencing to write. Sooner or later this begins to be accompanied by involuntary spasms of the muscles employed in holding the pen and the handwriting grows unsteady, scrawly and almost illegible. At first the spasms and irregular movements can be more or less controlled by voluntary effort, but they gradually become worse and worse, until at last the use of the pen is an impossibility.

Treatment.—Rest from writing, tonics and electricity accomplish a cure in some instances, but the prospect of recovery is small, and it is, therefore, very important to avoid the disease by moderation in writing, or by the use of the ingenious typewriter.

Wasting Palsy.—A few of the muscles of one limb, or the voluntary muscles of the whole body may lose their power and then waste away to almost nothing. Insidious in its approach the affection may last from six months to several years. It may end in recovery. The shoulder and ball of the thumb are frequent points of commencement for the palsy and atrophy.

LOCK-JAW.

(*Tetanus.*)

Description.—When a patient is the subject of an uncontrollable spasmodic contraction of the muscles of the lower jaw, he is said to have "trismus" or lock-jaw; and when the same condition attacks other or all the voluntary muscles of the body he is said to have "tetanus."

Causes.—1. Tetanus includes trismus and generally begins with it, though trismus may be a local affection. It is found in children as a result of dentition, and in adults as a consequence of diseases involving the teeth, gums or jaws. It is a spasmodic affection produced by reflected irritation set up by a local disease, is rarely associated with any constitutional disturbance and is, for the most part, cured on removal of the cause.

2. Tetanus is likewise generally associated with some local source of irritation, some wound or injury, it is then called "traumatic;" when an external or visible cause can be made out, it is denominated "idiopathic;" when rapid in its course it is called acute; when slow, chronic. The acute form is usually the result of an accident and generally fatal. The chronic is for the most part idiopathic and more curable.

Symptoms.—There are no general or local premonitory symptoms by which the onset of this affection can be recognized, and the earliest indications of its approach are generally a difficulty in opening the mouth, with stiffness in the muscles of the lower jaw; yet these symptoms may be so slight as to pass unheeded, or to be misinterpreted, when, however, some rigidity of the muscles of the neck, throat or abdomen can be made out and the first indications of the "tetanic grin" recognized.

3. As the disease progresses the muscular system of the body gen-

erally will be more or less affected, and, in different cases, different groups of muscles will be involved. Those of the back are most frequently attacked and their contraction may be so powerful as to cause an arching backward of the frame. The muscles of respiration are, as a rule, affected only in acute cases, and the chief danger to life consists in the severity of the spasms which attack them. When severe the first spasm may be fatal and may occur at an early or at a remote period of the affection. When the jaw is unlocked by a spasm of the depressor muscles, the tongue is sometimes suddenly shot out from between the teeth and often wounded.

4. As the disease advances the jaws become completely fixed and deglution is then impossible. The spasms of the muscles of the frame become more intense and frequent and the powers of the patient rapidly decline. The pulse which was rapid becomes more feeble, while the expression of the countenance betokens agony of the body and despair of the mind. The slightest manipulation or movement of the patient sets up a fresh spasm, and any emotion may do the same. The skin becomes bathed with a cold sweat, and, if death is not caused by suffocation, exhaustion soons puts an end to suffering.

Treatment.—Among the specific remedies which have been greatly trusted the Calabar bean stands foremost and may be given in full doses, such as half a grain of the extract in two or three hours. Camphor is also recommended in doses of from five to ten grains. The bromide of ammonium or potassium has been administered with advantage. It was hoped that a valuable drug for this disease had been found in chloroform, but experience has not justified the expectation. The hydrate of chloral has now taken its place and been of some service. Indian hemp in doses of a grain every hour, aconite and belladonna in quantities of one-fourth of a grain have also been recommended. Ice applied in bags along the spine has apparently been of great value. The administration of remedies by subcutaneous injection, in these cases, promises to be a valuable adjunct to practice enabling us rapidly to introduce into the system drugs which act antagonistically to tetanic spasm. Tetanus antitoxine should be administered early.

HYDROPHOBIA, OR RABIES.

Meaning the "dread of water," which is more correctly termed "rabies" is a disease contracted from a rabid animal, generally from its bite through the saliva or mucus.

Stages of the Disease.—In the dog there are three well-marked stages of the complaint. The first is the melancholic, characterized by melancholy, depression, sullenness and fidgetiness; the second, the furious, by excitement or rabid fury, and the last, the paralytic, by general muscular debility and actual paralysis.

Symptoms.—1. In man the disease may show itself at any period from six weeks to a year after the inoculation. A month or more after the bite of a mad dog, or other rabid animal, the wound having healed, irritation is felt in it, nervous restlessness also exists which increases (in most cases) to violent, angry delirium. Then difficulty of swallowing occurs from a spasm of the muscles of inspiration (gasping) taking place at the moment of deglutition, making the patient choke.

2. The same spasmodic gasping is brought on by any sudden impression, as of sound, a flash of light or even a current of air passing over the face. Insomnia exists; the patient grows prostrate and must die for want of food and drink, even if the affection of the cerebro-spinal axis were not itself fatal.

3. There is intense thirst, but the characteristic dread of water, not as a fluid, however, but as connected with the difficulty of drinking. The sight of water is frequently sufficient to bring on shuddering, yet it is when the patient carries water to his lips that he is seized with the typical terrors.

4. A rabid man is always rational and tries to drink, but the attempt excites terror and the expression of his inability. His eyes become fixed, features contracted and his countenance expressive of the deepest anxiety, his limbs shake, and the whole body shivers. The paroxysm lasts a few seconds, then subsides, but only to be renewed on the slightest breath of air touching the body. During the calm sudden terror of an unknown kind haunts the mind and imaginary calling of friends often exists.

Symptoms of Last Stage.—In the third and last stage the longing for drink becomes intense, with an increasing inability to take it; the voice becomes hoarse and the mouth full of frothy fluid. The patient tries to get rid of this by spitting, and then becomes frightened at its results. Convulsive seizures increase in frequency and intensity, the spasm of the respiratory muscles threatening life; at last a fatal spasm takes place and death by asphyxia ensues.

Treatment.—There is not satisfactory evidence that a case of genuine rabies canina or hydrophobia has ever been cured. If we cannot cure, what can or should we do? We may certainly promote easy death by

allaying the wretched sufferings of the patient by nitrous oxide, ether, or chloroform. Hypodermic injection of atropia or morphia might, perhaps, more effectually quiet the suffering and even afford more possibility of cure than inhalation of anesthetics. In all cases of bites from dogs or animals, however, in which the faintest suspicion of rabies exists, free cauterization with lunar caustic should be performed. Mental stimulants, in the way of inspiring hope and removing fear, must be duly administered and such general treatment as may be needed. No drug has yet been discovered that has the least influence on the disease, either in preventing or curing it.

What is known as the "Pasteur cure for hydrophobia" is in great favor among some medical men. It is rather a preventive agent or treatment and no doubt possesses great value.

FITS OR INFANTILE CONVULSIONS.

Causes.—The exciting causes are numerous, constipation of the bowels, indigestion, worms, irritation of the gums in teething and excitement of the brain, as by fright, are about the most frequent. Many acute and chronic diseases of infancy (scarlet fever, meningitis, whooping-cough, and so forth) have convulsions among their occasional symptoms or complications.

Symptoms.—Premonition of a fit is often observed in the child's fretfulness, or restlessness, or gritting of the teeth in sleep. When a fit comes on the muscles of the face twitch, the body becomes rigid at first, then in a state of twitching motion, the head and neck are drawn backward, the limbs violently flexed and extended; sometimes these movements are confined to certain muscles, or are limited to one side.

Treatment.—1. The treatment of a child during the convulsion is, of course, to be directed first toward relaxing the spasm, and immediately after that is accomplished to removing the cause of the trouble, which, in two cases out of three, will prove to be irritation of the gums or bowels. To shorten the paroxysm the child should at once be placed in a warm bath and a cloth wrung out of cold water applied to its head.

2. If the gums are swollen, or have been tender and irritated at the time of teething, lance them freely, dividing the tense gum down to the coming tooth. If the bowels have not been moved give at once an enema of castor oil, soap and glycerine, or some other laxative material, with warm water. If there is reason to suppose that the intestinal worms,

which most children harbor, are causing disturbance, active vermifuges such as a grain of santonine before dinner and supper for a child two years old, followed by two grains of calomel at bed-time, ought to be employed.

3. Cupping the back of the neck, in some cases where time is allowed by a protracted fit, may be resorted to, especially dry cups. Full doses of bromide of potassium, asafetida and valerian are often very useful in diminishing the excitability of the nervous system, which is especially great during the age of childhood.

PRESCRIPTION NO. 1.

R.—Bromide of ammonia ..... 40 grains
Bromide of potash ..... ½ drachm
Syrup ..... 1 ounce
Water ..... 1 ounce
Half a teaspoonful for a child 2 years old, every three or four hours.

PRESCRIPTION NO. 2.

R.—Bromide Soda ..... 3 drachms
Bromide potash ..... 3 drachms
Liq. potass. ars. ..... 1½ drachms
Peppermint water ..... 3 ounces
Infus. gentian co. ..... 5 ounces
Tablespoonful three times a day for an older child.

FALLING SICKNESS OR EPILEPSY.

Periodical convulsions with unconsciousness during the attack.

Causes.—Hereditary transmission of this disease is common. Intemperance, venereal excess and self-abuse, blows on the head and fright are among the most frequent exciting causes.

Symptoms.—Premonition occurs in a minority of cases before an attack; headache, dizziness, terror, spectral illusions, a creeping or blowing sensation, like that of a current of air or stream of water, beginning in a hand or foot and extending toward the trunk. Then, often with a scream, the patient falls down and is violently convulsed. Foaming at the mouth, grinding of the teeth and biting of the tongue are common; the face is flushed, the eyeballs roll, the pupils are unaffected by light, sometimes vomiting, or involuntary urination or defecation takes place; the respiration may be very laborious. The fit lasts on an average from five to ten

minutes. The interval between the attacks may be from several months down to a few days. In old cases there may be two or three paroxysms daily. They vary much, even in the same individual. The condition after the attack is also various, generally drowsiness or deep sleep follows it, or headache, debility or delirium, sometimes maniacal frenzy.

Treatment.—1. During the paroxysm, when habitual, little can be done. Place the patient so that he cannot strike his head or limbs against anything hard, loosen the clothing about the neck to form free respiration and circulation and insure fresh air about the patient, protect the tongue from being bitten, if possible, by placing a cork or piece of India rubber between the teeth. Care must be taken that such an object does not pass into the throat and choke the patient, which can be prevented by tying a strong string to it.

2. To break up the recurrence of the fits is the problem for which a vast number of remedies have been tried in vain. Bromide of potash, valerianate of zinc, belladonna, arsenic and digitalis have all been employed. Strangely enough this disease is very apt to improve temporarily under any new treatment, no matter how absurd, which takes a strong hold on the patient's imagination.

3. Self-management is very important to the epileptic. Temperance with nutritious diet is necessary; regularity of the evacuation of the bowels is imperative; abundant exercise in the open air, short of exhaustion, does good; systematic gymnastics have even cured some cases.

PRESCRIPTION.

R.—Bromide of potash ..... 3 drachms
Bromide of soda ..... 3 drachms
Bromide of ammonia ..... 3 drachms
Iodide of potash ..... 1½ drachms
Iodide of ammonia ..... 1½ drachms
Tincture of columbæ ..... 1½ ounces
Water ..... 6½ ounces
Take two teaspoonfuls before each meal and three teaspoonfuls at bed-time.

SPASMODIC CROUP OR SPASM OF THE GLOTTIS.

Causes.—This is the most important of several varieties of simple spasm in different parts of the body, among which ordinary croup is a familiar example. It consists in a spasm of the muscles of the glottis or

opening into the windpipe, by which a crowing or croupy cough is produced, with hard or stridulous breathing.

Symptoms.—This disease especially occurs in young children, where it is due to some reflex irritation, such as that of teething, reflected from the nerve centres which control the muscles of the glottis. It may generally be distinguished from the alarming malady, true croup, by its coming on suddenly without fever, marked heat of skin or quickened pulse.

Treatment.—To relax the spasm sprinkling of a little cold water in the face, or tickling the fauces with the finger or with a feather, so as to produce vomiting, frequently answers the purpose. Should it fail the child should be immediately placed in a warm bath. After an attack the gums should be carefully examined and freely lanced if found swollen, every attention being paid to the general health. Much needless alarm would be spared to anxious parents and nurses if it were generally understood that there is no likelihood of this disease leading on to the fatal malady, true croup, which may always be excluded from consideration if the child is free from fever, coughs loudly and has no huskiness of the voice. Give syrup of ipecac frequently until vomiting takes place.

CHOREA OR ST. VITUS' DANCE.

Causes.—From six to sixteen, in both sexes, especially often, however, in girls, chorea occurs. Nervous debility is almost always present before the attack. Fright is a frequent cause, overfatigue or mental excitement, blows or falls may produce it. Rheumatic fever is sometimes followed by it.

Symptoms.—Incessant and irregular movements of the voluntary muscles over which the will has but partial control. Walking in severe cases is difficult or unsafe; the hands cannot be regulated enough to write or work; speech may be affected; the muscles of the face often twitch grotesquely. The pupil is, in some cases, unnaturally dilated; palpitation of the heart may occur, and also constipation and indigestion. The urine is of great density; the countenance assumes a blank and foolish expression, and the mind itself may in time grow seriously enfeebled.

Treatment.—Good diet, salt bathing and systematic gymnastic exercises will suffice for mild cases. Where marked anemia exists iron (citrate, phosphate or hypophosphate, tincture of chloride, syrup of iodide) is important. Obstinate cases may be treated with Fowler's solution of arsenic, in small doses, gradually increased. Cod-liver oil

should be given if great debility exists. In chronic cases the tonics before mentioned with the addition of the hypophosphites should be resorted to, and change of climate is very likely to be of service.

HYSTERIA.

From its occurrence nearly always in females and from a supposition of its originating in some affection of the womb, this name has been given to a variable disorder, of which the main characteristic is morbid excitability of the whole nervous system.

Symptoms.—1. A "fit of hysterics" is a paroxysm whose nature may vary from mere uncontrollable laughter or crying to a severe epiliptiform convulsion. This last, however, differs from epilepsy in that being less complete loss of consciousness and in its curability.

2. Simulation of other diseases, indeed the assumption of severe functional disorders of different organs, is a common trait of hysteria. There may be hysterical amaurosis; hysterical insanity is not uncommon; nor is hysterical paralysis or coma rare. Retention of urine, cough, aphonia, and so forth, are often thus produced.

Catalepsy.—Catalepsy or trance is a condition allied to hysteria in some respects, in which the whole frame lies prostrate and helpless, or that a limb, lifted up, falls back as if it were relaxed and dead while yet the consciousness of the person affected may be retained without the sensitiveness to physical pain. This curious state of existence is not well understood, and in our present ignorance of its nature the chief importance lies in its being distinguished from death early enough to prevent that most horrible of all human misfortunes, being buried alive.

Hypochondriasis.—This is a very obstinate affection, often hereditary, and occurring more frequently in men than in women. During the attack there is apparently great depression of mind without mental disease. The patient imagines he is afflicted with maladies of the most varied kinds; is tormented with ideas of impending miseries and dangers; thinks he suffers from swellings or contortions of the body, which may be purely creations of fancy. This disorder in the male corresponds very nearly to hysteria in the female and like it can only be cured by attention to the general health. Tonics, exercise and cheerful occupation are the best remedies.

Treatment of Hysteria.—Much skill and care will often be required in the management of hysteria, as each one has peculiarities of its own.

Generaly a tonic regimen is demanded. Iron and cod-liver oil are most often the appropriate remedies. Bromide of potassium is sometimes quite useful. For a paroxysm of "hysterics" asafetida is universally safe and reliable in pills of three grains each. Sinapisms and pediluvia are also proper. Menstruation is often irregular in hysterical women; it should be regulated as far as possible. Exercise in the open air, as a rule, is very important for such persons. Mental and emotional excitement should be avoided; but tranquil, even engrossing, occupations will be beneficial. For hysterical paralysis electricity is promptly useful. Cold bathing, especially the shower-baths or sea-bathing, when followed by reaction, will do good.

NEURALGIA.

Meaning.—Pain, without inflammation or other disorder, except that of the nerve or nerve-control involved; literally nerve pain. This may affect any of the sensitive nerves. It is also sometimes referred to parts which have, in health, no sensibility; as the heart, stomach, and so forth. Different names are given according to its site. Thus, tic douleureux is facial neuralgia; hemicrania, that affecting one side of the head; sciatica, that of the hip; gastrodynia, neuralgic pain in the stomach; pleurodynia, in the side. Angina pectoris is, chiefly, a neuralgic affection of the heart.

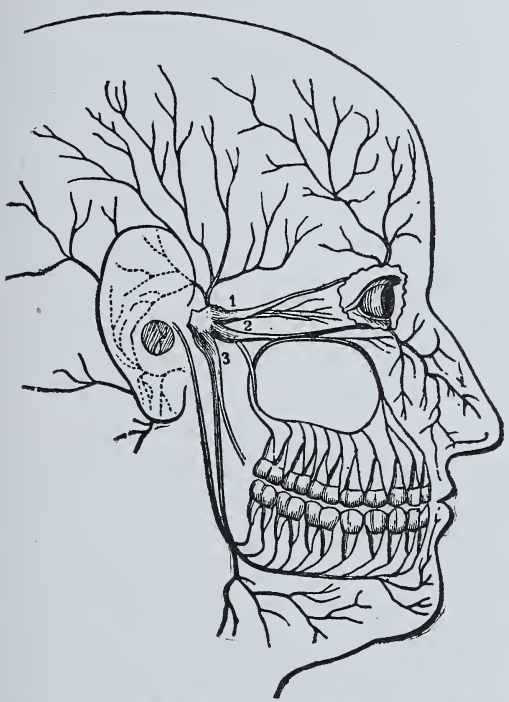
Symptoms.—The pain is generally acute, shooting or darting, with tenderness of the part upon pressure. There is, however, no heat or swelling, or throbbing of the blood-vessels in pure neuralgia. Complicated cases occur in which inflammation and neuralgia exist together, and inflammation of the fibrous neurilemma may be the immediate cause of the neuralgic pain.

Causes.—Neuralgia is always dependent upon debility arising from one cause or another, as, for instance, anemia, mental anxiety, gout, rheumatism, syphilis and dyspepsia. In fact, a great German authority upon nervous diseases declares, with as much truth as poetry, that "neuralgia is the prayer of the nerves for iron in the blood."

Next to the sciatic nerve no other is so often the seat of neuralgic pain as the trifacial, and this is, perhaps, partly owing to the fact that the superficial branches are spread out over a large surface upon the side of the face and more exposed to cold and changes of the weather than any other part of the body where the epidermis is equally delicate. Terminal branches of the trifacial come out through the bones of the head at points over the eye, beneath the eye and at the side of the chin—as shown

in the marginal illustration. These, then, are the tender points, where all the branches of this nerve are involved in the neuralgia, and it is from these points that the darting bony pains seem to radiate.

Hemicrania or Migraine.—This is a combination of neuralgic symptoms with ordinary headache occurring in paroxysms, and usually limited to one side of the head or brow. It is apt to commence in childhood and go on to advanced age, occurring in both sexes, but more often in women than in men. In women the attacks are especially apt to appear just before the menstrual period or during its course.



Distribution of Nerves on the Side of the Face.

Causes.—The headache is probably due to excitement of the sensitive filaments of the trifacial nerve—distributed to the dura mater—and also to the sympathetic fibres accompanying the blood-vessels, which connect the nervous supply of the brain with that of the stomach so intimately.

Symptoms.—As generally manifested it increases rapidly soon after waking in the morning, with chilliness, loss of appetite, sliminess of the mouth, sickness of the stomach, vomiting of a little greenish fluid, and at last the headache becomes so intense as to be almost unbearable.

Sciatica.—This is often associated with both rheumatism and gout, but is also frequently brought on by catching cold. Occasionally it is due to accumulations in the bowels, or to diseases of the bones through which the nerve makes its exit. The painful points are usually found back of the trochanter or most projecting point of the thigh bone, at certain spots in the thigh about the knee and ankle joints.

Intercostal Neuralgia.—This, like intercostal rheumatism, resembles the pain of pleurisy and of pneumonia, and has often given rise to un-

founded anxiety as to the existence of these more dangerous diseases. It may be at once distinguished by careful examination of the lungs.

Neuralgias of the arms, neck, shoulder, and so forth, are unhappily common and sometimes very intractable.

Pathology.—At least three sources of pain are possible. 1st. Local disease affecting a nerve. 2d. A morbid state of a sensorial nerve centre. 3d. A morbid condition of the blood. Neuralgia always fixed or returning in the same spot, is likely, although not certain, to depend upon a fault in the nerve itself, as neuroma (tumor of a nerve). Radiating pain must at least involve part of a nerve centre. Flying pains, never long seated in one part of the body, are due to a defect or morbid poison (as that of gout or malaria) in the blood.

Treatment of Neuralgia.—1. This must, of course, depend upon the cause or nature of the case. Tic douleureux often depends upon decay of the teeth; if so, they must be attended to. Other purely local neuralgias require local treatment. Laudanum or paregoric, applied by saturating a cloth and laying it upon the part covered by oiled silk to prevent evaporation, is an efficient local anodyne. So is chloroform, similarly applied; it is very pungent, burning like mustard. Sinapisms will sometimes relieve promptly.

2. Mere warmth, as of flannel steeped in hot water, will do in some instances. Rubbing for a few moments with saturated tincture of aconite root until the skin tingles, or the application of ointment of veratria, twenty grains to the ounce of vaseline, may be used in severe cases. In the most obstinate ones a blister may be applied, dressed, after removal of the cuticle, with two grains of the acetate of morphia, diluted with ten grains of gum arabic. Carbolic acid is a powerful local anesthetic, though (unless diluted with oil or glycerine) very irritating to the skin; or, most prompt usually of all, solution of morphia may be hypodermically injected.

3. Of anodynes internally used, belladonna has, for neuralgia, the greatest reputation. It will not quell suffering so directly as opium or morphia, but it will more entirely do away with the neuralgic state. For this, however, iron, especially in combination with quinine or strychnia, is the most effective medicine. Cases of neuralgia which will not be benefited by iron are decidedly exceptional.

4. In some instances application of the galvanic current will remove the pain of neuralgia as if by magic, and when relief can thus be secured it is far preferable, as the distressing sickness, headache and constipation, which so often result from opium and other narcotics, may thus be avoided.

Auxiliary Treatment.—The hygienic treatment is almost equally important with the medicinal, and a thorough examination of the habits of life pursued by the patient will almost always lead to the discovery of some violation of sanitary law, which must be corrected before a hoped-for cure can be realized.

PRESCRIPTION 1.

R.—Menthol ..... 20 grains
Muriate of cocaine ..... 10 grains
Chloral ..... 5 grains
Vaseline ..... 3 drachms
Apply the ointment to face where pain is seated.

PRESCRIPTION 2.

R.—Citrate of caffeine ..... 10 grains
Phenacetine ..... ½ drachm
Make ten capsules. Take one every 2 or 3 hours.

PRESCRIPTION 3.

Tablets acetanilide and sodium bromide. One as needed every three or four hours.

DELIRIUM TREMENS.

Causes may arise under two different conditions or circumstances. Where stimulants are suddenly withdrawn from one accustomed to them; and, while their use in excess is continued.

Symptoms.—Sleeplessness, debility, tremors, horror, hallucinations, often with loss of digestive power. The insomnia is a cardinal symptom; if the patient sleeps a whole night he recovers. Debility varies in degree in different cases; in a first attack it is not always great, tremor is nearly always present. The illusions of the patient are wonderfully real, and usually dreadful. He is pursued by demons or beset by moral enemies; he cannot bear to be alone, especially in the dark. Sometimes, however, the visions are indifferent, or even amusing.

Treatment.—If the patient be not much prostrated, give only ale or porter, a bottle or two in the day, with hop tea *ad libitum* and a grain of opium every three or four hours. Very weak patients, accustomed to spirits, might have a tablespoonful of whiskey or brandy every two, three or four hours, according to their condition. Hydrate of chloral sometimes

answers as well as, or better than, opium. Bromide of potash with tincture of hyoscyanus repeated every three to four hours.

Diet.—Beef tea and mutton broth, and so forth, seasoned with red pepper, are preferred as diet. In an obstinate case sleep may follow the raising of a blister upon the back of the neck. Substituting valerian for opium, or combining the fluid extract or tincture of valerian with morphia solution answers well in some cases. Injection of laudanum into the rectum is occasionally resorted to. Success in treatment has been obtained from the use of chloroform in doses of one or two drachms. The corrugated stomach of a spirit drinker will probably bear the pungency of chloroform better than anetheis. The large majority of first attacks of mania-a-potu are curable. Third and fourth attacks are often fatal, or are followed by permanent insanity.

PRESCRIPTION 1.

R.—Indian hemp ..... 10 grains
Divide into 12 pills. Take one every two or three hours until drowsy.

PRESCRIPTION 2.

R.—Hyoscyamus ..... 1 grain
Alcohol ..... 1 drachm
Water ..... 1 drachm
Inject 5 to 10 minims with hypodermic syringe.

INSANITY OR MADNESS.

Causes.—1. This consists chiefly in a particular organization of the brain and nervous system, rendering those individuals so constituted liable to become insane when exposed to the influence of certain agencies, which in other persons either give rise to a different train of morbid phenomena, or are, perhaps, devoid of any injurious effects.

2. Among the agents which give rise to madness there is none more influential than intemperance, or the frequent use of ardent spirits. That the predisposition to madness, when it has once arisen, is frequently transmitted, is a fact too well established to admit of doubt.

3. The exciting causes of insanity may be divided into moral or psychical and physical. The principal psychical are grief, fright, anxiety, care, or an excited state of any passion; the emotions aroused by disappointment, excessive or prolonged employment of the intellectual faculties, and so forth. Anything which will produce a hyperemia of a por-

tion or the whole of the brain by which the nutrition and consequently the normal function is interfered with.

4. The principal physical causes are drunkenness and the use of narcotic or poisonous drugs, want of food, want of sleep and over-exertion; other nervous diseases such as epilepsy, chorea and hysteria; severe injuries to the head, particularly from blows, causing fracture of the skull or concussion of the brain, sunstroke and tumors in the brain. Acute febrile diseases as typhoid, typhus and malarial fevers, and it may occur during the course of pneumonia in the form of acute mania. The poison of Asiatic cholera may so interfere with the nutrition of the brain as to produce not only transient delirium but mania, which may continue several days or weeks. Acute rheumatism is sometimes a cause, chronic constitutional diseases are frequent causes, and among the most formidable of these is constitutional syphilis. Diseases of the genital organs sometimes exert an important influence in producing insanity.

Symptoms.—1. The earliest symptoms of coming insanity are depressed manner, unusual excitement, anger and rashness.

2. An important symptom in all forms of insanity is impairment of the faculty of attention. The inconsistency of the beliefs of the insane is one of the earliest noticeable symptoms, and they are classed as "delusions" and "hallucinations." A delusion is a false belief in regard to some fact which generally concerns the patient, and which is so strongly rooted that all attempts to reason him out of it are futile. A hallucination is a false perception of one of the senses; the patient may fancy that he sees a spirit or a person who does not exist.

Melancholia.—This may be acute or chronic, and is marked by extreme depression of both mind and body. The first stages of melancholia are generally preceded by a condition called hypochondriasis, which may be considered as the mildest form of insanity. There is a feeling of bodily illness at this time more than at any other, or in any other form of insanity.

Treatment.—1. The treatment of a case of chronic or subacute melancholia will vary with its history and symptoms. An asylum is not indispensable if the patient's means are sufficient to provide him with proper care. He may be benefited by travel and change of scene; but when his condition will not admit of this a proper place, either a private house or an asylum, should be selected, and an attempt made by therapeutical and hygienic measures to restore the cerebral defect by sleep and nourishment of the body.

2. There are three conditions which require constant attention: want of sleep, rejection of food and constipation. To remedy the first chloral is most beneficial. The practical aim is to produce sleep, regularity of the evacuations by laxative medicines and to sustain the strength with nourishing food and wine.

Mania.—There are two varieties, the acute and chronic. In the acute form the excitement is extreme, and follows closely upon the delusion or derangement of ideas. In the chronic form the delusion or derangement is confirmed but less obtrusive, while the excitement is subdued or comes on at long intervals. Mania has generally a sort of stage of incubation, during which sleeplessness is one of the most important and earliest symptoms. In another class of patients the primary symptoms are those of gloom and despondency, out of which the maniacal excitement appears to develop. In both varieties there is generally a marked departure from the individual's usual state of physical health. The different forms of mania in which the disposition to commit murder, suicide or arson, or to steal, is quite uncontrollable, are well known. When a single tendency of this kind is very prominent the case is usually denominated one of monomania.

Treatment.—The treatment consists on regulating the bodily functions, giving food freely, combined with plenty of drink, also wine, and in the judicious use of chloral. Rest is of the highest importance, and baths of warm water are of great benefit, the head to be kept cool during the operation. Purgatives at the outset of the attack may be of use, as aiding to arrest it.

PRESCRIPTION.

R.—Fluid extract of conium ..... 1½ drachms
Fluid extract of hyoscyamus ..... 1½ drachms
Hydrate of chloral ..... 2½ drachms
Syrup of orange peel ..... 1½ ounces
Take a teaspoonful every two or three hours, as occasion requires.

Dementia.—Dementia is literally a want of mind, and the word indicates a condition in which there is feebleness of intellectual grasp, or attention, imbecility of word and act and general deficiency of mental power. It is one of the common terminations of both mania and melancholia, and if long continued, its outward signs are a vacant and puzzled look, a lack-lustre eye, a weak smile and a meaningless laugh. This kind of insanity is almost a natural termination of extreme old age and is then

called senile dementia. Not infrequently the subjects of it become paralytic.

Imbecility.—Imbecility is a condition in which the mind is from birth unfitted for the active and thoughtful duties of life, and in which the person affected is said to be half-witted, or wanting in general intelectual capacity. This condition of deficient mental development may be associated with moderately good physical health in early life, but there seems to be usually some taint in the system, so that the family of imbeciles is, as a rule, short-lived, the members dying early of consumption, diabetes, or of some degeneration of the brain and spinal cord.

Idiocy.—Idiocy is a still lower grade of mental weakness, in which the intellectual faculties are below the standard necessary for reasonable life. In the true idiot the head is of a reduced size and the appetites and propensities are very little, or not at all, controlled by reason. Many idiots are deaf and dumb, but most of them retain their sight. The sad condition of these poor creatures may be often ameliorated by systematic training, but complete cure after puberty is hopeless.

Treatment of Insanity.—The treatment of insanity is generally best carried out in asylums for the purpose. To quiet a patient temporarily, or on his way to a suitable institution, bromide of potassium in quantities of thirty grains, or chloral in fifteen-grain doses every two or three hours, morphia by hypodermic injection, or otherwise, and even chloroform by inhalation may be necessary.

NEURASTHENIA.

Neurasthenia, sometimes referred to as spinal irritation, nervous exhaustion, etc., is a functional condition of the nervous system, causing a lessened desire to perform or attend to the various duties of life.

Causes.—Heredity is sometimes a factor; it may be an outcome of various chronic diseases; nervous temperament; overwork; sexual excesses; alcoholism; excessive use of tobacco, etc.

Symptoms.—Neurasthenia may affect any organ of the body. One of the earliest manifestations is a weakness of the mental faculties in not being able to concentrate the thoughts, endeavoring to do so bringing on headache, fear, feelings of weakness and depression, palpitation of the heart, coldness of the hands and feet and chilliness, often followed by flashes of heat. In males genito-urinary disorders frequently occur with dread of impotence. In females painful menstruation, ovarian irritation

and irritable uterus are frequently present. Care should be taken in diagnosing to distinguish between neurasthenia, or true nervous exhaustion, and nervous debility accompanying some organic disease.

Treatment.—Sight must not be lost of the fact that the patient is a sick individual and should have rest, quiet and good food. Pleasant companionship and relief from responsibility are essential and where possible travel is especially recommended, care being taken, however, that the patient does not become fatigued. Among the internal remedies of value are arsenic, strychnia, the valerianates, Pil. Carm-Allen and the hypophosphites.

Neuritis.—Simple neuritis, an inflammation of the nerve trunk, characterized by pain (often severe), impaired sensation and atrophy. Among the principal causes may be included wounds, injuries and compression of the nerves, exposure to cold or wet, rheumatism, syphilis. The affected nerve is red and swollen; the fibres have undergone some granular change. The inflammation may extend upward or downward. In long standing cases the diseased nerves are found to be made up largely of connective tissue replacing the degenerated structure. The most decided symptom is pain, with tenderness along the course of the nerve trunk, of a burning, tingling, tearing and often intense character, increased by pressure or motion. Sometimes contractions and muscular cramps occur, followed by impaired motion. The prognosis is favorable with proper treatment.

Treatment.—The affected part should be placed at rest. If the disease is severe, blister along the course of the nerve. Internally full doses of iodide of potassium. Sodium salicylate and phenacetine are often useful. Locally, sedative lotions. Leadwater and laudanum, oil of teaberry. Various liniments often relieve the intense pain. Syphilitic cases, iodide of potassium does the most good. If due to rheumatism, the salicylates and alkalies are indicated. If anemia is present, iron and hypophosphites is indicated.

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CURATIVE MEDICINE

PART IV

DISEASES OF THE EYE, EAR AND NOSE

Importance of Subject.—The diseases of the eye are so important, and serious injury or loss of the organs of vision is such a terrible misfortune, that they demand a careful consideration. For the better comprehension of this group it will be needful, however, to give some preliminary explanation in regard to the eye, and also the ear and nose, with their appendages.

Wonders of the Eye.—The eye is probably the most wonderfully ingenious and complex organ of the human body, and being proportionately delicate, requires to be guarded with the greatest care. Few catastrophes are more grievous than that of total blindness, and most people would rather lose all the other senses than be deprived of sight.

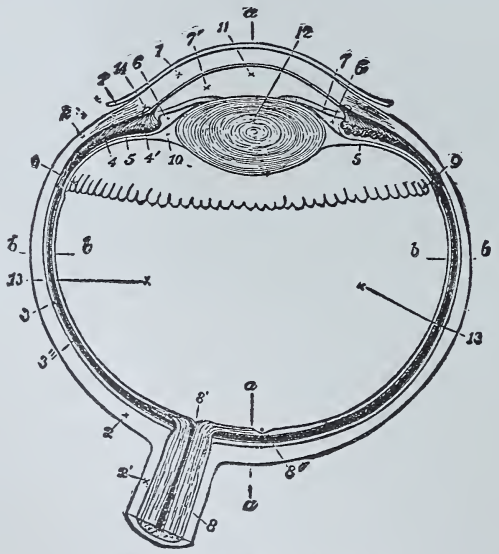
Structure of the Eye.—The intricate structure of the eye may perhaps be best comprehended if we remember that its general plan is that of a photographer's camera, the convex glass in the front of which corresponds with the crystalline lens of the eye, a picture of external objects being formed upon the artist's ground-glass plate in the one case, and upon the retina at the back part of the eyeball in the other.

The Retina.—Now, the retina is simply the expanded optic nerve, which has the peculiar power of perceiving lights or colors, and the chief difference between the eye and the camera is, that in the former temporary impressions only are perceived by the brain, through the optic nerve and retina, and in the latter instrument these temporary impressions are intended to be rendered permanent on the sensitive plate or paper, as a photographic picture.

The Eye Socket.—The eye is carefully protected from accidental injury by being embedded in a deep cavity or socket in the solid bones of the face and head, which guard it jealously from attack on either side and at the back. This socket is much larger than the eye itself, and the bony cavity is filled up behind and at the sides of the eyeball with an admirable cushion and packing of soft fat.

The Cornea.—The eye itself, as can be readily seen in that of a pig or sheep from a butcher's shop, is a white ball almost exactly round, except where the clear circle projects a little in front. This clear part, called the cornea (1), is as transparent as glass, and set in the space made for it in the white part of the eyeball, very much as a watch crystal is set in its frame. The white portion of the ball, called the sclerotic coat (2), is a tough membrane, very strong and dense, which gives shape to the organ of vision, and protects the extremely delicate structures within. The cornea and sclerotic coat each average about one-twentieth of an inch in thickness.

The Iris.—Inside of the cornea is a circular curtain, with a round hole in the middle, called the iris (7), so named because it varies so much in color, being frequently blue in blonde individuals, and brown or black in brunettes.



Section of the Human Eye.

The Pupil.—The round hole in the centre of the iris is called the pupil, and is the black spot seen on looking into a person's eye. This spot varies in size according to the amount of light, being larger in the shade and smaller in bright sunshine. In human beings it always remains round, unless the iris is diseased, but in the cat, for example, it changes its shape, becoming a narrow slit in a strong light.

Use of the Iris.—This closing up of that curious curtain, the iris, is a beautiful provision for shutting off an excessive amount of light, which would otherwise pass through the pupil in too great quantity, and irritate the sensitive parts of the organ of vision within.

The Sclerotic Coat.—The sclerotic coat is lined on its inside with a thin layer of black membrane, called the choroid coat (3), which seems to have almost exactly the same object as the black lining of the photog-

rapher's camera, namely, to absorb any extra rays of light, and so prevent the picture from being indistinct.

Structure of Retina.—Inside of the choroid coat, and immediately in contact with it, lies the retina, a third hollow ball, made up of an expansion of the optic nerve, which enters the eye at the back (8), through openings in the sclerotic and choroid coats. The retina is made up of several layers, the outermost of which is formed by the terminations of the nerve-fibres in what are called the rods and cones of vision. These rods and cones are so wonderfully sensitive that through them we can perceive the differences of color and outline in the images of objects formed within the eye. They therefore correspond to the sensitive plate in the camera of a photographer.

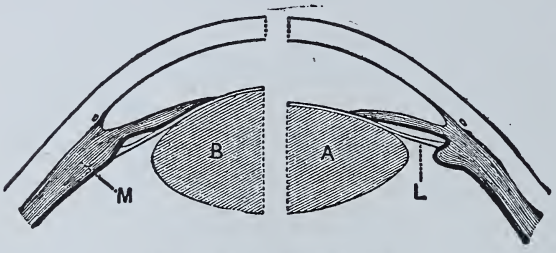
Other Portions of the Eye.—The remaining portions of the eye are chiefly useful in forming this image of which we take cognizance, and act upon the light exactly as the lenses of an opera-glass or of a camera do, except that they are provided with a more convenient way of changing the focus as may be required. The first of these which the light reaches, after it penetrates the cornea, is the crystalline lens (12).

Crystalline Lens.—This lens can be readily seen by squeezing it out of the eye of a pig or sheep after death, is very much like a large dew-drop or rounded diamond, in size, shape and general appearance, and is solid enough to bear gentle handling. It has the form of a small, thick magnifying glass or lens, and if held over the letters of a printed book, is at once seen to have the same power of making objects seen through it look larger.

Position of Crystalline Lens.—The crystalline lens is placed in the eyeball a little behind the iris, and is large enough to extend out beyond the edge of the pupil, unless that opening in the curtain is wider than usual. If it were not so perfectly transparent we could see the crystalline lens every time we looked a person straight in the eyes, as is shown in cases of cataract, a disease where the lens becomes first milky and then opaque, so that its position can easily be recognized, and the edge of the iris seen to move over it, as the pupil expands and contracts under the influence of varying degrees of light.

Arrangement of Focus.—Every one who has looked much through a telescope or opera glass, knows that a different arrangement of focus is needed to show a near and distant object clearly, and that this altered focus is obtained by adjusting the relating positions of the component lenses. In the living eye, nature contrives to obtain this necessary effect

of two or more lenses with a single one, by making that one (the crystalline) soft enough to change its shape a little, as shown in the diagram, and then providing a muscle called the ciliary muscle (M), through the action of which the lens may become more convex, that is, rounded (as at B), and so enable us to see near objects more distinctly. *It is the mechanical effort required to keep this little muscle constantly on the stretch that causes the eyes to feel so tired after long application over reading small print or doing fine work of any kind.* Hence, avoidance of too prolonged a strain of this nature is an important part of the hygienic care of the sight, on account of such a tendency as exists to exhaust the power of this muscle.



Flexible Crystalline Lens.

The Aqueous Humor.—The space between the crystalline lens and the cornea is filled by the aqueous humor (11), a watery fluid bathing the front and back of the iris, which, floating thus in a clear, transparent fluid, has an opportunity to move with entire freedom, and so most perfectly perform its duty as a curtain to shut off any excess of light whenever there is danger of a superabundance injuring the sensitive retina within. The aqueous humor, being shut in by the convex cornea, must, of course, take the shape of that clear membrane, and, forming with it a convex lens, still further aids the crystalline body in bringing the rays of light to a focus upon the retina, and so forming a sharp image upon that sensitive membrane.

Action of Aqueous Humor.—The action of the aqueous humor in this instance is precisely similar to that of water poured into a glass globe standing in the sunshine. Whilst the globe is empty, it has but little effect in concentrating the sun's rays into a focus, but when filled with water, its power as a lens is considerable, and it may even operate so energetically as a burning-glass as to set fire to inflammable substances placed at a proper distance. Want of suitable curvature, and also in many cases the fact of its being curved unequally in different directions, by making the lens or magnifying glass too strong or too weak, has much to do with causing imperfect sight.

Vitreous Humor.—The chief bulk of the eye is made up of the vitreous

humor, which receives its name from its vitreous or glassy appearance. This fluid is contained in the cavity of the retina, and has running through it numerous fine, interlacing fibres, as transparent as itself, which probably help to prevent the delicate retina from being injured by its shaking about during violent movements of the head and body.

Duty of Vitreous Humor.—The vitreous humor has little or no share in aiding to form the image upon the retina, but does perform an important duty in keeping the globe distended, so that in a sound eye the retina is held at the exact distance, where it can receive images of objects cast upon it in their sharpest and best defined condition.

How to Understand the Eye.—An excellent way to understand fully how the eye acts as an optical instrument, is to actually make a camera of the eye of an ox or other large animal, by cutting away the sclerotic coat at the black part, and then shading this in a small box, for instance, so that the images formed by cornea and crystalline lens can be seen inverted upon the translucent retina at the hinder portion of the eye.

Eye Diseases.—The diseases of the eye, according to the nomenclature here followed, are seventy-five in number, so that it is impossible properly to describe the treatment of any but the more important. Among the first of these are to be ranked the diseases of the conjunctiva.

CONJUNCTIVITIS OR OPHTHALMIA.

Character.—This is an inflammation of the delicate membrane over the front of the eye, covering the whole of the cornea, and the part of the sclerotic coat or white of the eye, which is naturally visible.

Symptoms.—The usual symptoms of inflammation can nowhere be observed more distinctly than in the eye; the four great characters of this morbid process, as described by Celsus, about the beginning of the first century, being very apparent. Here, as elsewhere, redness, heat, pain and swelling are the indications of inflammation, just as they were in the days of the old Roman physician, more than eighteen hundred years ago. The redness of the eye in this affection varies with the intensity assumed, but in severe cases it may completely obscure the white of the eye, so that the whole surface, except the cornea, appears quite red. The pain and burning heat of the eyes are sometimes almost unendurable.

The Swelling.—The swelling of the conjunctiva is often so considerable as to rise up all around the edge of the cornea, and this projection of the inflamed membrane may be so great as to prevent the eyelids from

being closed. Intolerance of light and profuse flow of tears, the latter resulting from irritation sympathetically extended to the lachrymal gland, which supplies those persuasive drops of salt-water, are common symptoms in some forms.

Catarrhal Conjunctivitis.—Catharral conjunctivitis or catarrhal ophthalmia, as it is also named, is the form of this affection usually produced by cold. Redness and pain, as if a particle of dust had got into the eye, with a free discharge of water, are the first symptoms. Intolerance of light is not very great, unless the cornea becomes involved. Vision may be slightly obscured, but is seldom seriously affected.

Treatment.—1. The treatment consists of active purgation with calomel (one-tenth to one-fifth of a grain every hour until one to two grains are taken), followed by epsom or rochelle salts. Soothing lotions to the eye, as, for example, that of sassafras pith with a very little extract of belladonna to begin with, and, after a day or two, applications of weak solutions of lunar caustic (silver nitrate) should be used.

R.—Silver nitrate ..... 15 grains
Distilled water ..... 1 ounce
Mix. Directions.—Apply to the inner eyelids with a little cotton wrapped on a toothpick or a matchstick.

The application should be made once a day for several days, and although the caustic solution smarts severely at first, it leaves, after fifteen or twenty minutes, an astonishing feeling of relief to the affected organ, and in favorable cases rapidly reduces the inflammatory action.

2. To prevent the eyelids from adhering during sleep, and so aggravating the trouble when pulled apart in the morning, an ointment should be used, preferably that recommended by Professor Pegensticker, which is a favorite of most physicians. The formula is:

R.—Yellow oxide of mercury ..... 1 grain
Vaseline or cosmoline ..... 1 ounce
Mix thoroughly and apply lightly to inner eyelids night and morning.

3. In many cases "ordinary salt water or a 2 per cent. solution of boric acid will suffice to effect a cure. Simple conjunctivitis of a chronic nature is often associated with catarrh of the nasal mucous membrane, and may be cured by correcting the catarrh of the membrane."

Pustular Ophthalmia.—This, called also phlyctænular conjunctivitis

and strumous ophthalmia, is the form in which the scrofulous predisposition to disease is very apt to manifest itself in young children. It is almost always accompanied with an eczema of the head or face.

Treatment.—In this affection general treatment for the constitutional disease is the most important. The patient should be placed in the best hygienic surroundings. The eyes should be kept clean with an antiseptic solution, as a 2 per cent. boric acid wash, and the yellow oxide of mercury ointment, mentioned above, rubbed into the eyes once or twice daily.

Purulent Ophthalmia.—This is a more violent and contagious form of conjunctivitis, in which the sight is sometimes seriously endangered. The discharge of thick, yellow pus or matter is abundant, and the inflammation sometimes progresses with great rapidity.

Treatment.—Active purgation, leeching followed by blisters behind the ears, and application of the stronger solutions of nitrate of silver, are often necessary to preserve the sight. In the contagious variety great care must be taken to avoid conveying the disease from the sick to the well by the use of soiled towels, handkerchiefs, and so forth.

Spread of the Infection.—In bad cases it is probable that the infection may occur by being wafted along in the atmosphere through a large room, or even through a whole house, as is seen sometimes in boarding schools and children's infirmaries.

Purulent Ophthalmia of Infants (*ophthalmia neonatorum*).—This is another contagious form of the disease, affecting new-born children and, if not properly attended to, destroying their sight. It is the result of an infection with the gonococcus which Niesser discovered in 1879 to be the cause of gonorrhea. The inflammation develops in less than three days after birth.

Symptoms.—First there is redness and irritability of the conjunctiva.

2. In about twenty-four hours an excessive secretion of tears and a whitish discharge appears.

3. This is followed later by a swelling of the lids and of the conjunctiva and a change in the character of the discharge from a whitish to a yellow, purulent type.

4. The child suffers very little at first, but later, when the discharge becomes more plentiful and thinner, the patient loses his appetite, is restless and suffers a great deal of pain.

Treatment.—The treatment is divided into two classes. 1. Prophylactive or preventive; and 2, Curative.

1. That prophylaxis is possible was demonstrated by Credé, a noted

obstetrician of Bonn, who reduced the percentage of these cases in the wards of his hospital from 13 per cent. to less than 2 per cent.

Application of the Treatment.—This he accomplished by dropping one or two drops of a 2 per cent. solution of nitrate of silver in the eyes of new-born infants. This procedure is commanded by law in some communities. American authorities only recommend it where the birth canal is presumed or known to be affected.

Analysis of Prophylactic Treatment.—The Cyclopedia of Medicine and Surgery (Gould and Pyle) says: The prophylactic treatment consists:

1. In removing the disease from the mother before labor if possible.

2. Through disinfection of the vagina before labor with solution of creolin, carbolic acid, boric acid, salicylic acid, mercuric chloride or other antiseptic.

3. Thorough disinfection of the child's eyes as soon as born.

These precautions should be carried out in all suspicious cases.

2. **Curative Treatment.**—After the disease has made its appearance, the most strenuous efforts and the most unceasing vigilance and care are demanded to prevent a partial or total loss of sight. Many of the blind we see about us, for whom we feel so much sympathy, can blame their unfortunate condition upon the lack of treatment in the first few days of their lives.

If possible a physician should be summoned at once and his orders followed implicitly, and it may be necessary for him to see the child several times a day to make the necessary applications.

Rules for Treatment.—If a physician can not be had, thorough attention to the following rules will probably result in a cure:

1. Cold applications which tend to lessen the amount of local inflammation.

2. Frequent and thorough flushings of the eyes with mild antiseptics, as boric acid in distilled water all day and night every hour or two.

3. The application of lunar caustic (silver nitrate) ten grains in the fluid ounce of distilled water, two or three times a day.

4. If any ulcers appear on the cornea, weak yellow oxide of mercury ointment should be rubbed, thoroughly but gently, into the lids twice a day.

5. Nourishment, cleanliness and warmth must be maintained.

Diphtheritic Conjunctivitis.—This is a condition of the eye caused by an infection with diphtheria. Fortunately it is extremely rare in America.

Symptoms.—Pain is present, the lids are swollen and hard. The dis-

charge is scanty and may be watery or a thin pus. The constitutional symptoms of diphtheria may be present.

Treatment.—Instillations of very weak solutions of atrophine will relieve the pain. Antitoxin should be administered very early. Otherwise the treatment is the same as in purulent conjunctivitis.

Trachoma.—Granular conjunctivitis, or granular lids, is also a contagious disease of the eyes.

Symptoms.—The inner sides of the lids become rough, inflamed, and covered with little projections which irritate the cornea at every movement of the ball or lids. It seriously affects vision, and is often very obstinate, but can frequently be vastly benefited.

Treatment.—1. Perseverance in constitutional treatment.

2. Local applications of nitrate of silver solution, or sulphate of copper to the granulations.

3. Unless improvement follows soon, local treatment should be discontinued and a specialist consulted. There is rarely complete recovery.

DISEASES OF THE CORNEA.

Causes.—Keratitis or inflammation of the cornea may occur from a punctured wound of the eye, or it may be the result of the scrofulous diathesis, or even more commonly of inherited syphilis. It occasionally results in ulceration of the cornea, which sometimes perforates this structure and, allowing the humors of the eye to run out, irrevocably destroys the sight.

Treatment.—Local treatment of the accompanying conjunctivitis and the use of atropia to keep the pupil dilated, so that it, the iris, may not become involved in the inflammation, are important, but the chief reliance must be placed upon constitutional remedies for those general diseases, of which this affection of the eye is little more than a symptom. The white spot or scar left by an ulcer of the cornea is generally permanent, and not only disfigures the organ of vision, but more or less completely obscures the sight for life.

Preventive Treatment.—Since a scar of this kind is so injurious and when once fully formed can scarcely ever be removed, the ounce of prevention is of tenfold importance, and every care should be taken, by securing the most skillful treatment for ophthalmia as promptly as possible, to reduce to its smallest dimensions the danger of such a catastrophe to sight.

THE EYE

FIGURE No. 1.—Iris, ciliary muscle and coroidea membrane.

1. The pupil.
2. Ciliary muscle.
4. Arteries of the coroidea membrane.

5,5,5,5. Sclerotic tunic, cut circularly and removed.

7. The optic nerve.

FIGURE No. 2.—Vertical section of the pupil.

FIGURE No. 3.—Artificial eye.

FIGURE No. 4.—External muscles of pupil.

1. Part of the sphenoidal bone to which some muscles are attached.

2.2. External straight muscle.

3. Optic nerve.
4. Internal straight muscle.
5. Upper straight muscle.
6. Lower straight muscle.
7. Upper oblique muscle.
8. Insertion of the upper oblique muscle of the pupil.
9. Lower oblique muscle.
10. Sclerotic tunic.
11. Cornea.
12. Cartilaginous pulley of the upper oblique muscle.

FIGURE No. 5.—View of the second pair of optic nerves.

1. Globe of the eye. The left, perfect. The right one has the sclerotic and coroidea tunics removed, showing the retina.
2. Quiasm of the optic nerve.
3. The whitish bodies.
4. The infundible.
5. Varolius bridge.
6. The medulla oblongata.
7. Third pair: motor nerves of the eye.
8. Fourth pair: pathetic.
9. Fifth pair: trigeminous.
10. Sixth pair: external motors.
11. Seventh pair: auditive and facial nerves.
12. Eighth pair: pneumogastric, accessory, spinal and glosso-pharyngeal.
13. Ninth pair: hypoglossus.

FIGURE No. 6.—Lachrymal apparatus (the skin of the eyelid has been removed).

1. Cartilage of the eyelid.
2. Insertion of the eyelashes.

3,3. Lachrymal ends or openings of lachrymal canals in the eyelids.

4. Conduit to the nose.
6. Cul-de-sac at the orbital extremity of the canal.
7. Lower corner of the eye.
9. Lachrymal gland.

10,10. Canals carrying tears to the eye.

FIGURE No. 7.—Formation of an image on the retina.

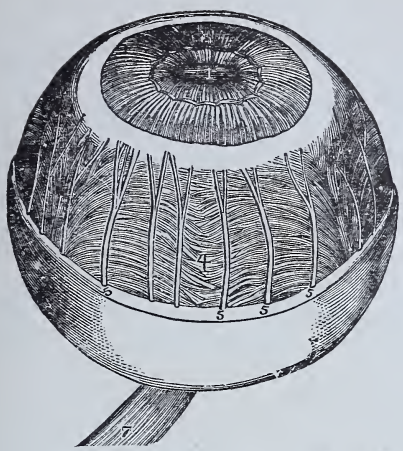


FIG 1.—The iris, the ciliary muscle and coroidea membrane.

FIG. 2.—Vertical section of the pupil.

FIG. 3.—An artificial eye.

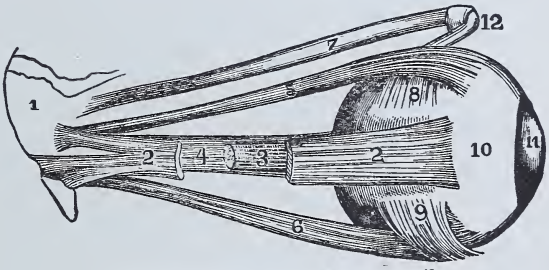


FIG. 4.—External muscles of the pupil.

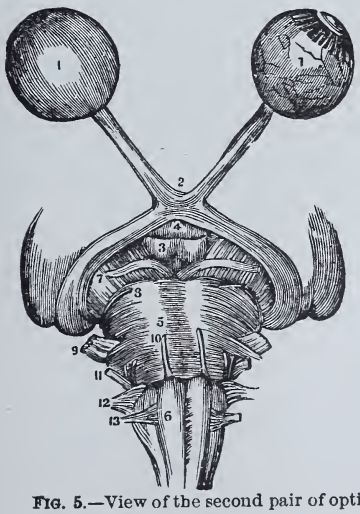


FIG. 5.—View of the second pair of optic nerves.

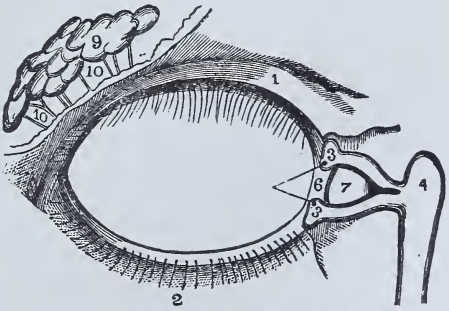


FIG. 6.—Lachrymal apparatus (eyelid skin has been removed).

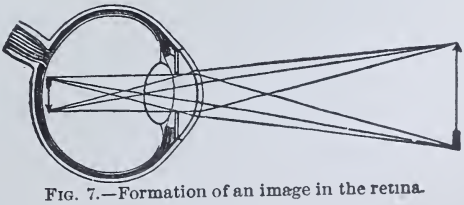


FIG. 7.—Formation of an image in the retina.

THE EYE.

For an explanation of the illustrations see text on opposite page

DISEASES OF THE SCLEROTIC COAT.

Symptoms.—Inflammation of the sclerotic coat, or sclerotitis, is generally characterized by the intense, deep-seated pain it causes, and by the pink hue of the white of the eye produced. The chief varieties are the rheumatic and the syphilitic.

Treatment.—The treatment is to be more especially directed towards counteracting by general remedies the poisons of these two virulent constitutional affections.

IRITIS.

Character.—This is an inflammation of the iris, which may be simple or gouty, syphilitic or scrofulous.

Symptoms.—Its symptoms are intense pain in most cases, although in others little uneasiness is felt; change in color of the iris, contraction of the pupil, and impairment of vision. Inflammation of the iris has always possessed a great interest for physicians, because it is the only cavity lined by a serous membrane into which we have the privilege of looking and seeing what is going on when the membrane which forms its boundary is inflamed. Hence, the observation of a case of iritis is not only the most interesting, but also the most instructive, lesson in the sciences of pathology and therapeutics which nature ever vouchsafes to us, as we carefully watch the progress of the disease and the effects of medical treatment from day to day.

Treatment.—Since one of the greatest dangers of iritis is that the pupil will be drawn together by the whitish lymph infused in the inflammatory process, and, by being thus closed, shut off the sight, it is very important to keep this opening of the pupil as large as possible by the use of belladonna, or its active principle, atropia, throughout the attack of iritis. Besides this, general bleeding, or free leeching behind the ears, or on the nape of the neck, followed by repeated blistering, should be employed, and active purgatives with mercury to slight salivation contribute toward the cure. Opium by hypodermic injection to relieve the intense pain, and cool anodyne applications to the affected organ, are valuable palliatives.

RETINITIS.

Character.—This is an inflammation of the retina and seldom occurs alone. It may be due to Bright's disease, may result from a specific taint, or may be of the hemorrhagic variety. The last named condition is nearly

always in the aged and is an occasional accident happening in cases where the kidneys are hard and shrunken.

Treatment.—The treatment is of course directed to the disease which causes this inflammation.

CHOROIDITIS.

Causes.—This is also usually in conjunction with systemic diseases, as tuberculosis, syphilis, rheumatism and gout. The suppurative variety may be due to a blow or may be carried from some distant suppurative process.

Treatment.—The treatment is directed to the cause and is mostly general.

AMAUROSIS OR GUTTA SERONA.

Character.—This is a disease of the retina, dependent upon various changes of the retinal surface and ending in an inability of the nervous expansion to receive and transmit visual impressions from the outside world to the brain.

Causes.—1. It may be produced by exposure of the eye for a longer or shorter period to a white, dazzling object like snow, and snow-blindness is the most familiar example of this affection.

2. It also occurs occasionally from accidents, such as lightning-stroke and blows on the head.

3. It may be due to degenerative changes in the retina following exhausting illness, or connected with sympathetic irritation.

4. Excessive use of tobacco sometimes produces it.

Treatment.—Where the cause of amaurosis can be discovered and removed, some hope of cure may be indulged, but ordinarily the melancholy fate of becoming permanently blind—as the poet Milton was rendered by this malady—awaits the patient. Of course, the earlier treatment is undertaken the better is the chance of arresting the malady before utter destruction of the sight is accomplished.

CATARACT.

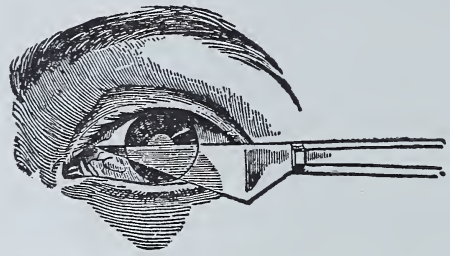
Character.—This is an inappropriate but long-established term indicating an opacity of the crystalline lens of the eye. In cataract, the lens becomes white and opaque, first at some point on its surface, or in the capsular membrane which envelops the albumenoid substance of which

the lens is composed. The opacity extends, until at length the whole of the lens may be involved, and blindness rendered complete.

Development of Cataract.—The development of cataract is usually slow in its progress, except in the case of diabetic cataract, or cataract from a punctured wound, which may form in a few days. The process of becoming totally opaque is called by surgeons the ripening of the cataract, and it is customary to wait for the cataractous change or ripening to be complete before any operation is attempted for its cure.

Causes.—Most frequently there is some change in the vascular system supplying the lens, and to this lack of nutrition is due. Senility, diabetes mellitus, convulsions, injury, exposure and privation are the causes.

Treatment.—No medical treatment, as yet discovered, is of any avail in the treatment of cataract, but the disease may be entirely remedied by the operation of extraction, which is illustrated in the accompanying figure. As there shown, a peculiar, wedge-shaped knife, called a cataract-knife, is used to cut an opening in the edge of the cornea, through which the opaque lens is carefully drawn out, and then the eye closed up and permitted to heal.



Operation for Cataract.

Restoration of Vision.—When successful, as this operation proves in the hands of skillful oculists nearly nine times out of ten, useful vision is restored, and by the aid of very thick spectacles, to substitute the lost crystalline lens, the patient is often enabled to read, write or sew, as well as before being attacked with this disease. This operation of extracting the cataract is generally the most successful with the common form, which occurs in old people, where the crystalline lens is not only opaque, but hardened into a sort of horny substance.

Treatment of Other Forms.—In some of the other varieties of cataract, such as that produced by wounds or other injuries, especially in young people, the treatment by breaking up the lens with a very delicate knife, about the size of a large needle, is resorted to with success. The old-fashioned operation for cataract by couching, or reclination of the opaque crystalline lens, is now generally abandoned, as being much less satisfactory in every way than the process of extraction.

Cataract Often Hereditary.—The tendency to the formation of cataract

is often hereditary, but something can be done by hygienic care of the eyes to avert, or at least to postpone, its active development. Since it has been found that operatives who use their eyes opposite to a very strong light—such as glass-blowers—are particularly liable to cataract, it is advisable to avoid such exposure as much as possible.

Effect of Electric Lights.—Very probably electric lights may tend to promote the formation of cataract, unless guarded with special care. It is a curious fact, however, and one which at once disproves the fanciful theory that cataract is a disease of over-civilization and excessive study, that cataracts are frequently met with in animals, especially the horse, where the disease may often be seen in great perfection.

GLAUCOMA.

Symptoms.—This is a disease in which the most prominent symptom is an increase in the tension of the eyeball. By primary glaucoma we mean an increase in tension originating in the eye itself independent of any outside influence. Secondary glaucoma is the same condition due to an injury, some previous inflammatory process, or resulting from valvular heart disease, and so forth.

If the glaucoma is simple in character, the first symptom is partial loss of vision. In cases of inflammatory character pain may be the first feature to attract attention and may be much more severe at times.

Predisposing factors are heredity, excesses of various kinds, gouty or rheumatic tendencies.

Treatment.—Medical treatment is of value in some primary cases. Warm applications may ease the pain, or instillation of one-quarter to one per cent. solution of eserine. Operative measures of various kinds may be necessary from iridectomy to complete removal of the globe.

WEAK SIGHT OR ASTHENOPIA.

Weak or enfeebled sight, though a term in familiar use, is not easily defined as specially connected with any constant change in the eyeball.

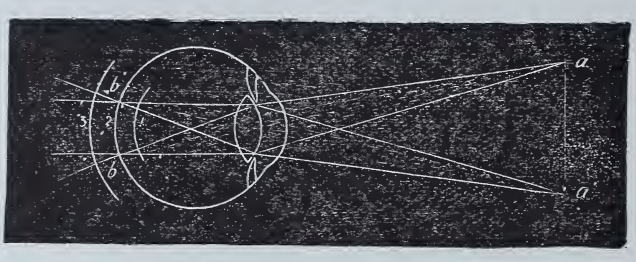
Causes.—It may be due to an irritable condition of the retina, or to an impoverished state of the blood. More frequently, perhaps, it arises from a want of power to keep up the accommodation of the eye for distances, to nervous anxiety about the sight, or to the commencement of one of the serious organic diseases about the eyes and its appendages.

Treatment.—Except in the latter case, much can be done by treat-

ment, using general and local tonics, and by care of the eyes in the mode to be pointed out in the next article.

SHORT-SIGHT OR MYOPIA.

Character.—This is a very common condition of vision in which, from the greater convexity or improper position of the lenses of the eyeball, the focus of parallel rays of light does not fall upon the retina, but at some point in the vitreous humor. This error of development, as it often is, will be better comprehended by the aid of the annexed figure, in which is shown a diagram of the eyeball and the course of the rays of light, to form a clear and distinct image of the arrow, on the retina at *b, b.* If, however, the eyeball is elongated, so that the retina occupies the position of the line marked 3, as is often found to be the case in near-sighted persons, it is obvious that the rays of light will have passed their true focus,



The Error in Curvature of Lens.

and consequently when they reach the retina in this wrong position can only give a blurred and indistinct image of the object.

Remedy.—The remedy for myopia is the use of a concave glass, accurately adapted to the particular eye for which it is employed, and just strong enough to render the rays of light so divergent when they strike the cornea that they will be brought to an exact focus upon the misplaced retina, in its unnatural position, making in this way one error precisely counterbalance the other.

Application of the Remedy.—This remedy should by all means be applied even in early youth, in order to prevent the effort of accommodation, the straining of the eye to see as much as other children do at school and elsewhere, from not only increasing the myopia, but laying the foundation of more serious disease and ultimately, perhaps, destroying the sight.

Increase of Short-Sightedness.—The alarming increase of myopia, and

especially its prevalence among young people of both sexes in city schools, must have caused many observant biologists to speculate as to the exact mechanism by which the unfavorable influences of our present civilization were at work so as to bring about this rapid deterioration of the visual organs in the last few generations of mankind.

Myopia Hereditary.—There is no doubt also that myopia is hereditary, and that according to the great law of "the extinction of the unfit," the children of myopic parents are predisposed to the development of this disease. Hence they will almost certainly suffer from it if they are exposed to conditions which would be apt to engender near-sightedness in healthy eyes, from any taint of hereditary tendency.

Preventive Measures.—Among the general conclusions arrived at by scientists for aiding in this object, so important to the rising generation, the following are worthy of especial notice:

1. In the first place, study-rooms should be well lighted during the day, and especially toward evening, because a feeble or badly-arranged light compels us to diminish the distance between the eye and the book whilst reading or writing.

2. Light should be allowed to enter from the left side. Illumination from the front is more or less dazzling, and obliges the pupils to bend forward too much, or to sit sidewise in constrained and fatiguing positions. Again, light coming from behind is entirely insufficient, because in great measure cut off by the head and upper part of the body of each scholar.

3. The windows of a school-room should be large and high, and be arranged along the left side of the apartment, so as to shed the light upon desks placed in rows, at right angles to the wall in which the windows are cut.

4. The light from above, furnished by a skylight, is not so good as that derived from lateral illumination. The light of lamps is recommended as being preferable to gas, and the gaslight shining through ground-glass globes is condemned as being particularly objectionable.

5. The inclination of the desk at which the pupil sits to read or write is a matter of no small importance. Desks which are horizontal, or only slightly inclined, favor the development of myopia, by compelling the scholar to bend the head over a good deal whilst reading or writing. Such a position brings on, as a result of mere weight of the blood, passive congestion of the head and eyes, and this in turn results in an intra-ocular tension, insensible, perhaps, when it first appears, but very marked in its effects when long and constantly continued.

Children's School Desks.—Besides, a child who acquires the habit of leaning forward in this manner is very apt to bend nearer and nearer his book, as the muscles of his back become fatigued, and thus, by straining his power of accommodation at short focus, promote the rapid development of myopia. The desks of school children should therefore be sharply inclined at an angle of 40 degrees or 45 degrees when used for reading, and their seats should not be too high, and should be furnished with comfortable backs.

6. Great care should be taken to secure school-books well printed in large, clear type; since those printed in small, indistinct letters, upon bad paper, with poor ink, as is the case with too many of the classics and the dictionaries in common use, necessitate a close approximation of the eyes to the page, and consequently exaggerated efforts at accommodation, favoring myopia. Furthermore, all punishments of school children which consist in depriving them of recreation or exercise out of doors, or in adding to their amount of study, and consequent employment of the visual apparatus, should be relinquished.

Faults of School Furniture.—The general principles which must be kept in view in the construction of seats and desks for school children, according to the investigation of Cohn and others, may be expressed as follows:

The faults of school furniture which give rise to injurious postures, and so conduce both to myopia and asthenopia, as well as to scoliosis or lateral curvature of the spine, are:

1. Want of, or unsuitable, backs.
2. Too great a distance between the seat and the desk.
3. Disproportion, generally too great a difference between the height of the seat and that of the desk.
4. Wrong form and slope of the desk.

Ideal School Desks.—Dr. Liebreich gives a very clear exposition of the way in which these defects cause the diseases already mentioned, and concludes with the subjoined recommendations, which he considers, however, less advantageous than what he calls the American plan of having the seat and desk made to every child's measure, or the Swiss system, where seven or more different sizes of seats and desks are manufactured to suit the different classes:

1. One and the same size and model desk should be used for children and grown-up persons of both sexes.

2. The adaptation to the height of each child should be effected by varying the height of the seat and the footboard.

3. The edge of the table is always to be in a perpendicular line above that of the seat.

4. No seat is to be without a back, and the top of this is always to be one inch lower than the edge of the table for boys, and one inch higher than the edge of the table for girls.

5. In all classes where the boys change places the height of the seat is to be regulated in proportion to the average height of the pupils.

6. In all girls' schools, in all those boys' schools where the children do not change places, in boarding schools, and in private schoolrooms, the seat of each child should be accurately regulated in proportion to its height.

Back Support, Etc.—The support for the back should incline only a few degrees from the perpendicular, and be so arranged as to press upon the spinal column just above the hips of the pupil. The breadth of the seat should be considerable, in order to support most of the thighs, and its height just such as to allow the feet to rest easily upon the footboard. The desk should be so arranged, by means of a hinged flap or otherwise, as to hold the book at an angle of 40 degrees or 45 degrees whilst reading, and the paper at an angle of 20 degrees whilst writing is being performed by the scholars.

ASTIGMATISM.

Definition.—This term is applied to a defect of sight due to a difference in the curves of the cornea and crystalline lens in different directions; that is to say, the cornea, for example, may be so curved in the direction of a horizontal line through it as to have a focus of one inch, and be so much less curved on a perpendicular line that its focus in that direction is an inch and a quarter. The result of this different refraction, in different meridians of the globe of the eye, is necessarily an indistinctness of vision, because all the rays of light entering the eye from a bright point are not brought precisely to a point again upon the retina as they should be.

Treatment.—This defect, which is found to be exceedingly common, especially in myopic eyes, can be very accurately corrected by the use of properly adjusted cylindrical glasses, which are so arranged as to distort the rays of light before they enter the eye just enough in a contrary direction to cause them to be brought to an exact focus by the imperfect cornea and crystalline lens of the astigmatic eye.

Use of Spectacles.—Spectacles giving this compensation ought to be procured and faithfully worn, not only because their use will tend to preserve the eyes, which would otherwise be apt to grow strained in the effort to make up for this defect by accommodating the lens, but also on account of the headache which is often the result of such constant effort to adapt the eye to clearer vision.

Day-Blindness.—Day-blindness is a term used to describe a disease in which the person affected can only see when the light is subdued, as in the twilight.

Night-Blindness.—Night-blindness, on the contrary, indicates a condition in which there is indistinctness of vision, except in a bright light.

Causes.—The causes of these two conditions are not very well understood, but night-blindness is known to chiefly affect those who have used their eyes too long and too steadily in a brilliant illumination or who have been exposed to intense or sparkling light.

Treatment.—Rest is the chief means of cure, but prevention of these diseases by the proper protection of the organs of vision by colored glasses, or by the mechanical appliances mentioned when speaking of light, is infinitely preferable.

DISEASES OF THE TEAR APPARATUS.

Character.—The lachrymal gland, which supplies the tears, and is situated at the upper and outer angle of the eye, is subject to inflammation and the usual structural changes which result from that process. The most common disease, however, connected with the lachrymal apparatus is obstruction of the lachrymal duct or tube, which runs from the inner corners of the eyelids down into the cavity of the nose, and conveys the tears into the nasal cavity, which, under ordinary circumstances, they merely serve to keep comfortably moist.

Causes.—This obstruction may result from inflammation of the lining membrane of the duct, caused, perhaps, by cold or brought about by acute or chronic inflammations of the nasal chambers. If neglected, abscess may result requiring surgical interference.

Treatment.—In its incipiency attention to the nasal passages and correction of the deformities and catarrhal condition there may suffice to effect a cure of the constriction of the duct. While acutely inflamed, anodyne lotions, as lead water and laudanum, cold or hot applications should be faithfully tried. When dilatation of the duct is demanded it should be continued until a cure is effected.

DISEASES OF THE EYELID.

STYE OR HORDEOLUM.

A stye is a little boil at the edge of the lid.

Causes.—When styes recur, refractive errors should be at once suspected and corrected. Ill health favors a stye as it does boils in other localities. Uncleanliness is sometimes the cause.

Symptoms.—These are so well known that it is not necessary to go into them. Suffice it to say that when a yellow spot is discernible on the stye, it is ripe and should be opened.

Treatment.—To hasten the pointing of a stye, apply hot compresses for fifteen minutes every two hours. Tonics are indicated in the debilitated; glasses—properly fitted—should be worn, and a boric acid eyewash used until long after the stye has disappeared.

WILD HAIRS OR TRICHIASIS.

Dangers.—This is the name for that growing in of the eyelashes, commonly known as wild hairs in the eye. Even one of these hairs, by rubbing upon the sensitive cornea whenever the patient winks, may cause much irritation and even injury to the sight.

Treatment.—Temporary relief is afforded by pulling out the offending hairs with small tweezers, but often a surgical operation is necessary to accomplish a permanent cure.

SQUINTING OR STRABISMUS.

Character.—This disease is the commonest of the derangements of the eyeballs within their orbits. In it the eye is involuntarily drawn from its straight position to one or the other side, so that the natural and agreeable parallelism of its axis with that of its fellow is not maintained. When the eyes are turned in toward the nose, as is more commonly the case, the strabismus is called *convergent,* and when the squint is outward, it is spoken of as *divergent* strabismus.

Causes.—This defect is due either to shortening of one of the six little muscles by which the eyes are moved in their sockets, or to the spasmodic contraction of one of these muscles, or to paralysis of one of them and relative over-action of its natural opponent. Strabismus is in

some cases an acquired affection, and may even result from the bad habit among children of imitating deformities of this kind. More frequently it appears to be the product of hereditary tendency. It may affect both eyes in the same person, and even in the same direction, and is then called double strabismus, or it may be confined to one eye, the other remaining perfectly healthy.

Treatment.—Something can be done in the treatment of this malady when it first commences in children who are not too young to wear spectacles by having these arranged with half pieces of black glass, so that the patient is compelled to look straight forward. But the simple operation of cutting through a part or the whole of the contracted muscle is in suitable cases the best remedy, and often, not always, proves perfectly successful in removing the deformity.

TRACHOMA (Granulated Eyelids).

Trachoma is a highly contagious disease which attacks the eyes. It is a granular conjunctivitis, characterized by small, sago-like elevations on the conjunctiva, followed by the lids adhering to the eyeball, ulcers form and the eyelids contract and are deformed, at the same time destroying the sight.

Persons of all ages suffer from this disease and school children are exposed to it in the mountainous districts of Kentucky and other States in the United States.

The disease is spread by the ignorant persons of pauper countries, where their habits are dirty. They usually know nothing of sanitation or hygiene. They live in large numbers in small huts or cabins, which are scarcely large enough for two people; all using the same towel and sleeping in the same bed with the one who suffers from the disease.

Prevention.—A child or adult suffering from trachoma must be isolated from the rest of the family, school children, etc. As these cases occur among the very poor they should receive treatment in a public institution. The State and Federal authorities can prevent its spread by appropriating money to fight the disease, by sending into the mountainous districts, physicians and nurses to treat and educate the people; erect suitable buildings to place the sufferers in until cured.

Every person with granulated eyelids or sore eyes should summon a physician, or report the trouble to the local board of health, as immediate attention to the trouble will prevent blindness and protect others. No case

should be treated by home remedies. *Delay means blindness to you and others in the community.*

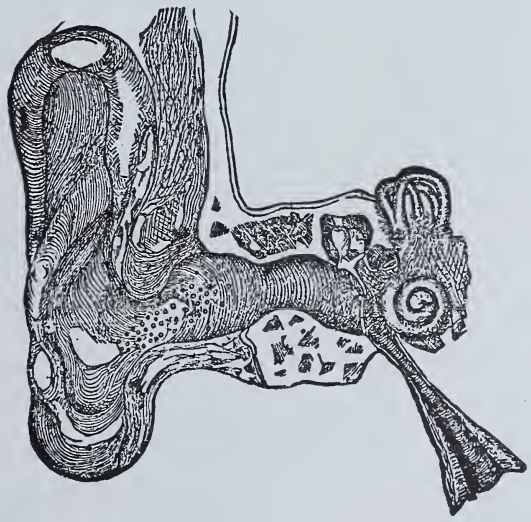
Do not use a towel that any one else uses if you have granulated lids. Do not go near any public place where people congregate. Do not use the family linen, etc.

Blindness spreads through ignorance of the individual, the State's and the National Government's indifference to the dangers of gonorrhœa and trachoma by not appropriating funds to fight them. The negligence of the sufferer from gonorrhœa, his shame and lack of treatment are reasons for blindness.

Educate your children in the danger of these diseases, watch their morals and have them treated when contaminated. Be free from disease before marriage.

DISEASES OF THE EAR.

Number of Diseases.—The number of diseases of the ear is twenty-four, but as a majority of them require for their recognition and effective treatment more or less peculiar and costly apparatus, only a few of the most important require notice in this chapter. For the understanding of these, however, a brief review of the anatomy of the ear is necessary.



Section of Right Ear.

Anatomy of the Ear.—The external ear, or auricle, as anatomists call it, is supposed by many people to be the chief part of the organ of hearing, but in reality the essential pieces lie inside the head, some, indeed, imbedded in the most solid bone of the skull, and one so hard that it has received the name of the *petrous* or rocky portion of the temporal bone.

Auditory Canal.—Besides the auricle, which is all that portion of the ear projecting from the head, the external ear is considered by anatomists

THE EAR AND ORGANS OF HEARING

FIGURE No. 1.

1, 2, 3. The inner cavity open, showing the spiral lamina.
4, 5, 6. Rest of the cells of the inner cavity.
7, 8. Vestibule.
9, 10. Upper canal.
11, 12. Lower canal.
13. Outer canal.
14, 14. Semicircular membranous canal.
15,16,17. Acoustic or auditive nerve.

FIGURE No. 2.

1, 2. Origin and end of the helix.
3. Antihelix.
4. Antitragus.
5. Tragus.
6. Lobe of the outer part of the ear.
7. It points to the navicular pit, and is in front and over the wing.
8. Shell.
9. Outer auditive duct.

FIGURE No. 3.

1. Swelling of the upper semicircular canal.
2. Swelling of the outer canal.
3. Swelling of the lower canal.
4. Upper semicircular membranous canal.
5. Outer membranous canal.
6. Lower membranous canal.
7. Spaces between the semicircular membranous and bony canals, supposed to be filled with coatunni humor.
8. Common duct formed by the union of upper and lower membranous canals.
9. Place where the inner semicircular canal opens into the elliptical urn of the vestibule.
10. Elliptical urn which contains the:
11. Breschid otocones.
12. Spheric urn containing also some:
13. Otocones.
14,15,16,17,18. Expansions of the acoustic nerve to the membranous canal and the elliptical urn, and also the spheric.
19. Turns of the spiral lamina.
20. Ladder of tympanum.
21. Nervous expansion to the back swelling.
22. Vestibule ladder.
23. Modiolus.

FIGURE No. 4.

1. Thickness of outer covering of inner cavity.
2, 2. Vestibule ladder or upper cover of the spiral lamina.
3, 3. Tympanum ladder or lower cover.
4. Hook of the inner cavity.
5. Centre of the infundible.
6. Round opening communicating with the tympanum.
7. Thickness of the outer cover of the vestibule.
9. Oval opening.
10. Orifice of the aqueduct of the vestibule.
11. Lower semicircular canal.
12. Upper semicircular canal.
13. Outer semicircular canal.
14. Swelling of the lower canal.
15. Swelling of the upper canal.
16. Common orifices of upper and lower canals.
17. Swelling of the outer canal.

FIGURE No. 5.

1. Normal size. The other is much enlarged.
2. Zone of acoustic nerve.
3. Arrangement of filaments in the vesicular zone.
5. Membranous zone.
6. Bony texture of the modiolus.
7. Opening between the two ladders.

FIGURE No. 6.

1, 1. Zone of the acoustic nerve.
2, 2. Filaments of the same in the bony zone.
3, 3. Anastomosis in the vesicular zone.
4, 4. Membranous zone.
5, 5. Fold of outer edge.
6, 6. Axis of inner cavity.
7. The modiolus.
8, 8. Outer bony walls of the inner cavity.
9, 9. Bony layers of the spiral lamina.
10. Vestibule ladder.
12. Hook of the inner cavity.
13. Infundible.
14. Horse hair passed through the course of the spiral lamina.

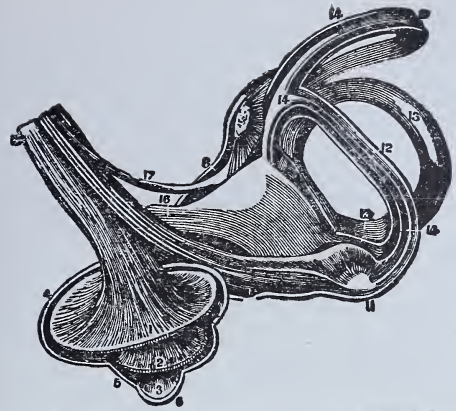


Fig. 1.—View of the labyrinth in a straight position, open to show the distribution of the nerves.

Fig. 2.—View of the left ear in its normal state.

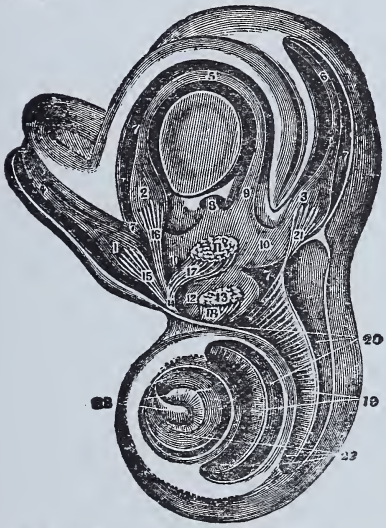


Fig. 3.—View, very much enlarged, of the external phase of the bony labyrinth of the left side, open, exposing the vestibule and its contents, etc.

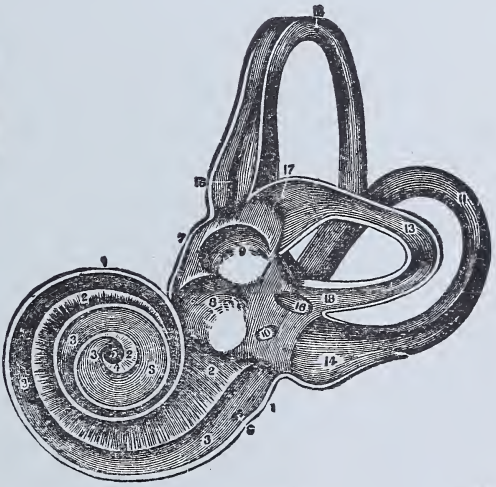


Fig. 4.—View of the labyrinth on the left side, open throughout, in order to show its structure—enlarged.

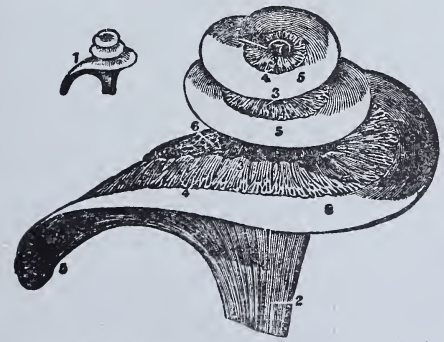


Fig. 5.—Figure or imaginary plan of the inner cavity of the ear.

Fig. 6.—Vertical section of the inner cavity of the ear, very much enlarged, showing the arrangement and connection of the different parts.

THE EAR AND ORGANS OF HEARING

For an explanation of the illustrations see text on opposite page.

to include the auditory canal (a) or opening into the head, and the delicate tympanic membrane or drumhead (b), which is drawn across the auditory canal like a curtain, at a depth of about one inch and a quarter from the outside.

The Ear Drum.—The middle ear, as it has been named, called also the drum of the ear, is bounded outwardly by the tympanic membrane, and inwardly by the bony portion of the labyrinth or internal ear. It includes the Eustachian tube (c), which is a fleshy pipe, communicating through the head with the upper and back part of the throat, and it contains the ossicles or little bones of the ear (d, e, and f).

Ossicles or Little Bones.—The ossicles are three in number, and are named from their resemblance to the familiar objects after which they are called—the hammer (d), the anvil (e), and the stirrup (f). These remarkable little bones play a curiously elaborate part in the mechanism of hearing.

The Labyrinth.—The chief portions of the internal ear, or labyrinth, as it is often called, on account of its perplexing structure and function, are the cochlea or snail-shell (g), and the semicircular canals (h). The appearances of these are sufficiently indicated by their names, and their positions can be best understood by looking at the adjoining picture.

Use of the Auricle.—The object of the auricle in man is to collect the waves of sound, just as the broad mouth of an ear-trumpet does, and it seems to have no other duty in the process of hearing. In order to prevent, as far as possible, the entrance of insects with the sound-waves into the auditory canal, the exterior opening of this tube is guarded by stiff, coarse hairs.

Ear-Wax.—It is also generally covered with a sticky, bitter substance, the ear-wax, secreted by numerous ceruminous glands (i), apparently to stop, or disgust, any adventurous creatures which may attempt to make their way in toward the drum. This provision is highly necessary, because the tympanic membrane is so exceedingly sensitive that a very slight touch, even from the foot of a small insect, would cause intense pain.

Delicacy of the Drum.—On account of this great delicacy of the membrane of the drum, it is unsafe to put any hard object into the ear for the purpose of cleansing it. Hence, the corner of a towel is far better to wipe out the ear than an earpick or any other solid instrument.

Wax Plugs.—Sometimes a firm plug of wax accumulates in the external auditory canal, and causes deafness, which, however, can be en-

tirely and immediately cured if the hardened wax is removed by syringing with warm water.

Foreign Objects in the Ear.—When children put beads, grains of corn, and so forth, into their ears, no attempt should be made to pick them out with hairpins or bodkins, lest, on the contrary, they be pushed further down the tube. It is much wiser to send for a physician, who is provided with suitable, delicate forceps for removing them without risk of such a serious addition to the original misfortune.

Insects in the Ear.—If an insect makes its way into a person's ear, notwithstanding nature's safeguards against such an accident, the patient should at once lie down on the opposite side and have the affected ear filled with olive oil, which will probably kill the creature and cause it to float up to the mouth of the auditory canal, where it can be picked out.

Office of Auditory Canal.—The office of the auditory canal is to convey sounds, after they have been collected by the auricle, to the drum-head, which is caused to vibrate just as that of a soldier's drum does when it is beaten, or rather as the sounding-board of a piano does when the keys are struck. The vibrations thus produced are transmitted along the chain of ossicles, that is to say, the handle of the malleus or hammer, being fastened to the tympanic membrane, moves with it. In thus moving it tilts the incus or anvil slightly over, and this motion of the anvil in its turn causes a slight oscillation of the stapes or stirrup.

The Stirrup.—But the stirrup is fastened by its foot-plate to the membrane covering a little hole in the bony wall of the labyrinth, called the oval window, so that any vibration of the drum-head or tympanic membrane is carried along over this chain, or bridge of bones, to the covering of the oval window. Behind this latter membrane the whole labyrinth is filled with a watery fluid, which bathes the terminations of the auditory nerve in the cochlea.

The Semicircular Canals.—The exact use of the semicircular canals is not understood, but there is little doubt that the fine hairs proceeding from cells found in the cochlea are thrown into vibrations by undulations transmitted from the membrane of the oval window through the fluid contained in the cavities of the labyrinth. Then these vibrations of sound are perceived by the delicate nerve-fibres, in which auditory nerve terminates, very much as the undulations which constitute light and color are perceived by the filaments of the optic nerve, where they terminate in the rods and cones of the retina. Obviously, with such a complicated and excessively delicate mechanism for carrying on the process of hearing,

the wonder is, not that few people hear imperfectly, but that everybody is not as deaf to all sound as the world has been in previous ages to the teachings of hygiene.

DISEASES OF THE AURICLE OF THE EAR.

Ear Tumors.—This outer part of the ear is the occasional seat of gouty and other deposits, which give rise to prominences and irregularities of its surface; it may also be affected with a kind of vascular tumor called hæmatoma, and still more frequently be the seat of benignant and malignant or cancerous tumors, and of various malformations.

Sizes of the Ear.—In persons of slight and delicate organizations, with a scanty stock of vitality, the outer ear is often exceedingly small, although it may be perfectly shaped. In persons of large build and actively circulating blood, the auricle is sometimes relatively large, the lower lobe being pendulous and of exaggerated development.

What Large Lobes Indicate.—As a rule, a large lobe of the ear indicates a free vascular supply of blood to the brain, and is said to be to some extent a sign of epilepsy, and of other kindred nervous diseases.

Danger from Earrings.—If people choose to run the risk of suffering from the dangerous little tumors which are sometimes caused by the barbarism of wearing earrings, they should be very careful to diminish the chance of injury as much as possible by having the auricle pierced with a clean, bright instrument, and by preventing the cartilage, which sometimes comes quite low down in the lobe of the ear, from being wounded.

Boxing and Pulling Ears.—Children should never be punished by "boxing" or pulling the ears. The former piece of brutality might instantly burst the tympanic membrane, causing deafness for life, and the latter is liable to originate severe inflammation of the auricle, leading to the same unfortunate result.

ECZEMA OF THE AURICLE.

Symptoms.—The symptoms of this affection are the same as of acute eczema and the reader is referred to the article on that subject. There is also a chronic form in which the skin is thickened and crusts are formed.

Causes.—1. Detention, when it is due to nerve-irritation.

2. Discharges from the ear which irritate the auricle.

3. Hoods by pressing the auricle against the side of the head and preventing the evaporation of the perspiration.

4. A chronic form sometimes found in old people is due, likely, to a weakened "tone" of the tissues.

Treatment.—The treatment is the same as in eczema of other parts of the body. Where it is possible, the cause should be removed. Cleanliness is essential, but water is contra-indicated and the crusts should be removed by olive oil. The ammoniated mercury ointment, which is official and to be had at all drug stores, should be applied twice daily after thorough cleansing. Cod-liver oil and iron are often used as internal remedies.

HEMATOMA OF THE AURICLE.

Definition.—This is a swelling of the auricle in which there is an infusion of blood between the cartilage of the auricle and the perichondrium. It is frequently caused by traumatism and often occurs in the insane.

Symptoms.—The symptoms are swelling and slight pain.

Treatment.—Gruber recommends, if the blood is coagulated, incising the tumor and removing the clot. Painting with tincture of iodine is advised for the thickening. Cold or warm applications may be tried to relieve the pain.

MASTOIDITIS.

This is an inflammation with pus filling up the porous portion of the mastoid bone back of the ear. It may be primary or secondary, though the latter is seldom observed. Among the predisposing causes are inflammation of the middle ear, exanthematous diseases, la grippe, tuberculosis, syphilis and pathogenic infections. There are instances on record where it has existed for months without subjective or objective signs, but as a rule it characteristically manifests itself at an early stage.

Symptoms.—The symptoms of acute or primary mastoiditis are heat, redness and swelling of the skin behind the auricle, and tenderness upon pressure. This primary disease usually terminates in three or four days in recovery or else in an involvement of the deeper structures with the formation of an abscess.

In the secondary form the symptoms vary in different individuals, manifesting themselves before or after spontaneous rupture of the drum. Tenderness, persistent or remittent pain and redness with swelling over

the mastoid and bulging of the superior and posterior auditory canal, are the most prominent symptoms. The temperature varies from normal to 104 degrees F. and is much higher in infants as a rule than in adults. If the case be observed before rupture the drum will be seen bulging in the posterior and superior portions. After the rupture of the drum the discharge from the ear is usually profuse.

Treatment.—The treatment of mastoiditis is divided into medical and surgical—by medical in this instance being meant minor surgical methods and the application of antiphlogistic remedies. When early observed effort should be made to abort acute inflammation of the mastoid by cold application by use of the Leiter coil or cracked ice bags. This should be continued for twenty-four hours without interruption. The patient should be absolutely confined to bed and given light diet and gentle purgative. If the pain and inflammation continue after forty-eight hours an operation will in most cases be necessary. To relieve elevation of temperature, acetanilid in five-grain doses may be repeated hourly until fifteen grains have been taken.

Mastoiditis is of such serious character and is liable to such complications that if it be suspected the best medical advice obtainable should be secured without delay, for none but an expert can properly care for the sufferer from this disease and know just whether an operation be necessary or not.

DISEASES AND AFFECTIONS OF THE AUDITORY CANAL

BOILS OR FURUNCULOSIS.

Character.—This is one of the most painful maladies that flesh is heir to. It is rendered so frightfully painful by the fact that it is shut in between a layer of strong cartilage and solid bone. Probably the most common cause of abscess in the ear is taking cold, although picking the ears with hard, sharp instruments sometimes seems to excite it. As it is impossible to tell which side of the auditory canal the abscess is going to form, early in the case, lancing must be deferred.

Treatment.—As a rule, all that can be afforded in the way of relief is gained by hot poultices made out of ground flaxseed, bread and milk, or little bags of hops dipped in hot vinegar and changed very frequently, or as soon as they grow cool. As soon as the abscess is well localized it should be opened by a physician, thereby relieving the patient of a great deal of suffering. In the meantime some respite and sleep may be ob-

tained by the use of opium suppositories containing one grain each used every four hours, or hypodermic injections of one-eighth to one-half of a grain of morphia.

BONY TUMOR OR EXOSTOSIS.

Causes.—An exostosis or bony tumor occasionally springs from the walls of the auditory canal, pushing the mucous lining before it, and filling up part or all the calibre of the tube. It is most frequently met with in people of a rheumatic or gouty tendency. Until chiseled away it is sometimes very painful and a serious obstacle to hearing.

WAX OR IMPACTED CERUMEN.

Causes.—This is the name given to that condition in which the canal is partially or completely filled with ear-wax. The wax may be very hard and may be mixed with dirt and dust. It is caused sometimes by the shape of the canal, and on the other hand is often due to one's occupation.

Symptoms.—Deafness, dizziness and buzzing in the ear are frequently complained of, but to make sure that impacted wax is present it should be seen. It appears as a dark mass in the canal.

Treatment.—If the wax is soft, it may be removed by repeated syringings with warm water. If it is hard, the canal should be filled with warm olive oil and then the syringing tried. An instrument of any kind should never be introduced into the canal for its removal by the unskilled hand.

FOREIGN BODIES IN THE EAR.

Symptoms.—Inanimate foreign bodies, such as beads, buttons, grains of corn, etc., give rise to the same symptoms as impacted wax. In the case of grains, water tends to swell them and so makes their removal more difficult. In such cases the surgeon should be called upon.

Use of Syringe.—Insects occasion great pain which may simulate intense neuralgia, or, by a reflex action, may refer the pain to the teeth and so lead one astray. The syringe should be used and heated water is very grateful to the patient, soothing the inflamed part. Great care is necessary that the water is not hot enough to do injury.

DISEASES OF THE TYMPANIC MEMBRANE OF THE EAR

EARACHE.

Character.—Inflammation of the drum-head is an acutely painful affection, sometimes attended with fainting fits in its early stages, and usually resulting in deafness because the membrane is left thickened, and therefore incapable of properly responding to the vibrations of sound.

Treatment.—Leeching, followed by blisters behind the ear, or on the nape of the neck and opium internally or hypodermically, to mitigate the suffering, which is often very severe, will prove of great value. Hot applications to the ear in the shape of bags of hops, a stove lid wrapped in flannel, or the hot-water bottle may be sufficient to give relief.

Treatment of Children.—In young children a hot foot bath will relieve by dilating the small blood-vessels of the lower extremities and so drawing some of the blood from the inflamed area. As hot water as can be borne may be dropped into the ear. A two per cent. solution of cocaine will generally relieve the pain.

PERFORATION OF THE TYMPANIC MEMBRANE.

Causes.—This is especially liable to occur during the course of scarlet fever from suppuration of the middle ear, and if neglected leads to permanent deafness. Hence, in scarlatina, the ears of a child should be carefully examined daily with the little conical ear-speculum, if there is the slightest complaint of pain in them, in order to prevent this disaster by early puncture of the drum-head, which allows the escape of the imprisoned pus, and so saves the organ of hearing. Still, when the perforation remains in the drum-head the auditory sense is often only slightly impaired.

Treatment.—Suppurating or running ears need, above all things, that cleanliness should be maintained as much as possible. If pus remains in the middle ear, a chronic inflammation is kept up and normal tissue is destroyed—eaten away as one might say. Hearing becomes more and more difficult and life is constantly in jeopardy, for the bone may become affected and the brain finally exposed to infection and a brain-abscess develop. Cleanliness may be maintained usually by washing out the ear with a hot solution of carbolic acid two or three times daily. A two per cent. strength is sufficient. If this fails to cure the ear, which would

be evidenced by a cessation of all symptoms, especially pain and discharge, a specialist should be at once consulted. Dead or necrosed bone may be present, or granulation tissue—"proud flesh,"—and should be removed as soon as possible.

Thickening of Tympanum.—Thickening and condensation of the tympanic membrane are liable to occur in advanced life, the delicate skin forming the drum-head undergoing a slow process of change, by which it loses its elasticity and becomes firm and hard almost like the nail of the finger. Of course, in this condition the vibrations into which it should naturally be thrown are rendered very imperfect, and the hearing is correspondingly defective in old people who are the subjects of this degeneration.

DISEASES OF THE EUSTACHIAN TUBE.

Causes.—The Eustachian tube is liable to inflammation from extension of disease from the throat, even such a simple irritation as that of a common cold. It is also subject to obstruction and contraction, so that the air cannot pass freely through it into the cavity of the tympanum, as it should do in health. When this takes place, the vibration of the drum is interfered with, there is pressure within the cavity, and consequently a sense of fullness and deafness is experienced, which is very oppressive.

Treatment.—This distressing condition can often be greatly relieved by calling in a skillful aurist, who may pass a probe or hollow tube along the Eustachian canal into the middle ear, and so restore the communication of the latter with the external air.

Diseases of the Middle Ear.—Diseases of the middle ear and of the internal ear comprise inflammation, ulceration and abscess. All these are very painful, difficult to recognize with certainty, and, as a rule, beyond the power of any but the most skillful treatment. In every case an experienced aurist should therefore be immediately called in, and until he arrives the severity of the pain may, perhaps, be held in check by some of the means suggested when speaking of abscess of the auditory canal.

DISEASES OF THE NOSE.

Anatomy of the Nose.—The organ of the sense of smell is much more extensive than people who have never studied anatomy imagine. Instead of being merely a triangular projection of some two or three inches long, and an inch or an inch and a half high, occupying the middle of the face it is a large double cavity reaching far back into the head, and communi-

cating by the posterior nares or hinder nostrils with the upper part of the throat. The external portion of the nose is composed at its upper third of small bones, which are continued at its lower part by plates of cartilage.

Nose Bones and Cartilages.—These cartilages and bones are covered on the outside with a thin skin, and on the inside with a mucous membrane, which in the deeper recesses of the cavity is identical and continuous with that of the mouth and throat. The external division between the two nostrils is carried upward and backward by a flat, very thin bone named the vomer; and the sides of the two cavities, which are continuous with the exterior nostrils, are partly filled up with soft, spongy processes of bone, three of which are called the turbinated bones, because they are rolled up like a scroll.

The Mucous Membrane.—These turbinated bones are covered, like the rest of the nasal cavities, with a mucous membrane, named the Schneiderian membrane, richly supplied with blood-vessels, which approach very near its soft and delicate surface. It is from these small, but active, little blood-vessels that the hemorrhage usually comes in bleeding from the nose.

The Olfactory Nerves.—The nerves of smelling, called the olfactory nerves, enter the upper part of the nose through openings in the sieve-like bone, which forms the roof of the nasal fossa. After passing into the nose, these olfactory nerves divide up into a great number of tiny branches, which run along under the surface of the Schneiderian membrane, and are spread out upon the superior and middle turbinate bones, and on the sides of the partition between the two nasal cavities. The great use of the turbinated bones and processes is to furnish a large extent of surface upon which these branches of the olfactory nerve can be expanded.

Functions of the Olfactories.—And this spreading out of the olfactory nerve is evidently in order that the sensitive filaments may, on occasion, come in contact with as large a number as possible of the exceedingly minute, odorous particles which many substances, such as musk or camphor, are constantly giving off in such abundance.

How We Smell.—These odorous particles have the power of affecting the terminal filaments of the olfactory nerves in different ways, which we recognize as the agreeable or disagreeable odors of the objects from which they originate. The excessive minuteness of such particles may be comprehended from the fact that the apartment of the Empress Josephine in one of the French Imperial palaces was found, after twenty-

four years of disuse, to give off a distinct odor of the musk employed by that unfortunate lady when she occupied it.

Uses of the Sense of Smell.—The power of distinguishing odors, which to some animals, including all those beasts which pursue their prey by scent, is one of the most vitally important, chiefly serves as a means of gratification or its opposite to human beings.

Hygienic Office of Smell.—But although the sense of smell does not in civilized communities contribute anything toward sustaining life by helping us to secure food, it has a very useful hygienic office, which should never be forgotten, in guarding us against some of the most common and dangerous causes of disease, in foul air and polluted water.

Nose as a Warming Organ.—Besides this the nose has an important work to do in warming and, to some extent, purifying the air we breathe, as that air is drawn through the narrow and winding passages among the turbinated bones. The Schneiderian membrane over which this air passes being generally moist, and more or less covered with adhesive mucus, helps to catch not only the odorous particles, but larger and more hurtful impurities, and so is quite mechanically a valuable protector to human health.

NOSE BLEED OR EPISTAXIS.

Causes.—Nose bleed may be due to a blow, picking the nose, the presence of a foreign body in the nose, or to the use of instruments in the nose. Diseased conditions within the nose often occasion it. In girls it may replace the natural menstruation. Diseases of the heart, liver and kidneys may give rise to it.

Treatment.—In cases of slight bleeding, pressure or the snuffing of ice-water may suffice. If these fail, cotton dipped in a one to ten thousand solution of adrenalin, should be packed into the nostril and kept there for ten or fifteen minutes. Iron, tannic acid and alum—the remedies our grandmothers used—are now supplanted by this modern drug which does not irritate the delicate lining of the nose as the old remedies did. If the adrenalin solution does not check the hemorrhage, it may be necessary for the physician to plug up both the anterior and posterior nostrils by the aid of an ingenious little instrument which has been devised for that purpose.

NASAL CATARRH

Forms and Causes.—"Catarrh" is a word derived from the Greek word *katarheo,* meaning to flow down, and is used in medicine to designate a

particular form of inflammation of the mucous membrane. It has many forms and is due to many causes, and no one has ever found nor ever will find one remedy for catarrh. This truth should be better and more generally known by the intelligent public.

Causes.—As causes of catarrh may be mentioned:

1. Climatic influences. Many patients lose their catarrh when they change from one climate to another.

2. Inherited predisposition. One cannot inherit catarrh, but the weakness of the mucous tissues may be inherited and so predispose to the affection.

3. Indigestion, constipation, intestinal parasites (worms), heart, lung, liver and kidney diseases are often provocative of a catarrhal state of the nasal mucous membrane.

4. Many fevers at their beginning or during their course are accompanied by acute catarrhal disturbance. Typhoid fever, measles, and scarlatina are examples.

5. Deformity within the nasal chambers is one of the most frequent factors, and local remedies are of no avail as far as a permanent cure is concerned. In these cases the only sensible treatment is the correction of the deformities, thus bringing the organ into a condition as near the normal as possible.

Catarrh as the Cause of Tuberculosis.—There is a general belief that catarrh is to blame for the great majority of the cases of consumption. This needs some modification before it is to be accepted. Surroundings, family predisposition, climate, and weak, non-resisting tissues are as much to be blamed for the occurrence of this terrible malady. Catarrh does, however, play some part as a factor.

Liability of Infection.—Professor Osler, of Johns Hopkins University, says on this subject: "The liability of infection in the cervical and bronchial glands in children is probably associated with the common occurrence of catarrhal processes in the throat and bronchi." This means that neglect of catarrhal conditions in a child makes that child more likely to be infected with tuberculosis, and if the family has a history of tuberculosis there is all the more reason for thoroughness of treatment of the existing catarrhal condition.

FETID CATARRH OR OZENA.

Character.—This is a term applied to a form of catarrh characterized by a horrible and peculiar stench and the formation in the nose of crusts of dried secretions upon which the fetor depends.

Causes.—In some cases it is due to a constitutional disease, as syphilis. In the majority of instances, however, it is the continuation of a catarrhal inflammation, in which the mucous membrane shrinks—atrophies—and the secretions therefrom are changed, becoming more tenacious and concentrated.

Symptoms.—These are the crusts and the peculiar fetor mentioned above.

Treatment.—Cleanliness is the great *sine qua non*—a fact easily remembered when one realizes that the fetor is from the decomposing crust. To detach the crusts various washes have been prescribed. A solution of bicarbonate of soda is a good solvent and may be prescribed as follows:

R.—Bicarbonate of soda ..... 2 ounces
Common table salt ..... 1 ounce
Menthol ..... 4 grains
Mix. Directions: Half a teaspoonful in a cup of warm water, snuffed up the nose until the nostrils are clear. Use twice daily.

Or,

R.—Bicarbonate of soda ..... 2 ounces
Biborate of soda ..... ½ ounce
Salicylic acid ..... 1 drachm
Menthol ..... 4 grains
Mix. Directions: Same as for preceding prescription.

Or,

R.—Liquor antiseptic alka. ..... 6 ounces
Use freely night and morning with an atomizer.

Or,

R.—Dobell's Solution.
Dilute with three or four parts of warm water and use as a nose wash.

Steam Inhalations.—If these washes are not effectual in removing the crusts, steam or hot vapor inhalations may be tried. In obstinate cases it is often necessary to remove the crusts with some force, either

with cotton on a probe or with forceps. After the crusts are gotten rid of, antiseptics and deodorizants should be employed. Weak solutions of potassium permanganate, bichloride of mercury, and when the patient can stand the pain, a one-half to a one per cent. solution of formaldehyde.

Removal of Dead Bone.—When the fetor is due to dead bone, the dead bone should be at once removed.

Treatment of Syphilitic Catarrh.—If a syphilitic taint, either inherited or acquired, is the foundation of the odor, proper constitutional treatment should be instituted at once and maintained until long after the nasal symptoms have disappeared.

GRAPE-LIKE TUMORS OR NASAL POLYPS.

Causes.—Nasal polyps are grape-like tumors which are dependent from the upper and outer wall of the nose—on the inside—and are supposed to be one of the possible results of chronic inflammation of the lining mucous membrane. They are rarely seen before the fifteenth year.

Symptoms.—When small they may present no symptoms. If they are large they may cause obstruction to the respiration, pervert the nasal secretions, cause headaches, give a nasal twang to the voice, and, in some cases, undoubtedly provoke asthmatic attacks.

Treatment.—The treatment is removal, which may be accomplished by twisting the tumor free from its attachment, by cutting it at its base, or preferably by using a wire snare.

ACNE ROSACEA.

Nature.—This is a skin disease affecting usually the skin-covering of the nose, is chronic, and is characterized by redness, thickening of the skin, and more or less acne.

Causes.—These are various. According to Prof. Van Harlingen, "in early life it is generally due to anemia and debility, nervous prostration or dyspepsia. In later life the use of spirituous liquors is often the cause, and, perhaps nearly as often, dyspepsia in some of its forms." In women, disturbances of the menstrual function, even pregnancy, may act as a causative factor.

Treatment.—To be successful persistence in treatment is often necessary. The first thing to be done is to remove the cause. "Uterine and menstrual derangements are to be looked after, the stomach and bowels kept in good order, and all hygienic measures used to improve the general

health. Alcoholic and malt liquors are to be totally eschewed. Tea and coffee should be drunk in moderation and not strong. Inveterate tea drinkers are very apt to have red noses."

The Favorite Drug.—The favorite drug both for internal and external use in this disease is ichthyol. Internally it may be administered in peppermint water, equal parts of each, ten drops being the dose and given every four to six hours. Locally it may be used as an ointment or as a paint:

R.—Ichthyol ..... 1 drachm
Subnitrate of bismuth ..... 1 drachm
Ammoniated mercury ..... 1 drachm
Vaseline ..... 10 drachms
Mix. Apply freely before retiring. (Dr. Latoir.)

R.—Ichthyol ..... 1 ounce
Oil of eucalyptus ..... 10 drops
Oil of bergamot ..... 5 drops
Mix. Paint on at night; wash off in morning with soap and warm water; then apply dusting powder. (Merk.)

Vleminck's solution is recommended by Stelwagon, diluted one to ten parts of water. The formula for the strong solution is:

R.—Calcis ..... ½ ounce
Sublimed sulphur ..... 1 ounce
Water ..... 10 ounces
Boil down to six ounces and filter. Apply locally three or four times a day.

ADENOID GROWTHS.

These growths resemble proud flesh. They grow in the back part of the nostrils, and are generally due to catarrhal conditions. They block the nose passages, producing snoring and difficult breathing. The treatment consists in scraping them away with a scoop, or even with the finger, to the great relief of the patient.

WARTS ON THE NOSE.

Treatment.—Warts in this locality are often mistaken by the laity for cancer and afford the charlatan and the advertising doctor an opportunity to make "cures" of this greatly feared disease. Warts in this locality are treated just as in other parts of the body.

PART V OF BOOK IV

Tells of the circulatory and absorbent systems of the body and the affections to which they are subject.

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CURATIVE MEDICINE

PART V.

DISEASES OF THE CIRCULATORY AND ABSORBENT SYSTEMS

New Medical Views.—Affections of this class were, until recently, supposed to present symptoms of very much the same general character, and therefore to constitute a class of maladies which possessed considerable unity in their intrinsic nature. They are now, however, found to consist of a variety of distinct affections producing very different and sometimes opposite symptoms. Thus hypertrophy produces increased and dilatation diminished force of the circulation. In order, therefore, to appreciate the value and familiarize ourselves with the nature of each class of symptoms, it is necessary to study the several affections in an isolated form. We are thus enabled, on meeting with a compound case—one consisting of a complication of several of the simple affections—to analyze or unravel the symptoms, ascertain the relative importance of each class, and in this manner establish rational and secure principles of treatment. In conformity with this view, the various articles on the diseases of the circulatory and absorbent systems, instead of being assembled under the present head, are for facility of reference, diffused alphabetically throughout the work.

ACTION OF THE HEART.

Hearing the Heart-Beats.—If we apply the ear, with or without the stethoscope, to the cardiac region of a person in health, we perceive most distinctly a series of sounds of a very marked and peculiar kind, subdivided into uniform parts by a brief interval of silence after every second sound. Two sounds follow each other instantly, or within so short a space

that the ear separates them rather by difference in their quality than from the intervention of any notable cessation of sound; then ensues a brief but well-marked pause, which is again succeeded by the first of the time sounds. This series of sounds may be perfectly well represented, as to rhythm, by musicial notation. The relative duration of the sounds and pause is represented by Lawrence to be nearly as follows: the whole being divided into four parts, two of these are occupied by the first sound, and one by the second sound and the pause respectively.

Difference in the Sounds.—The two sounds differ in kind as well as in duration. The first is nearly double the length of the second, of a graver and more subdued tone, rather louder at its commencement than at its termination, as if it was about to die away, when suddenly interrupted by the second. The second is brief, smart and clear, like a gentle tap with the pulp of the finger on a solid table, or like the sharp sound produced by the pulling back of a valve, the cracking of a whip, or the lapping of a dog. Exactly synchronous with the first sound, there is perceptible, in most cases, a well-marked impulse or shock communicated evidently by a body in motion within, in the walls of the chest. Every one acquainted with anatomy and physiology will at once conclude that the sounds and impulse just described are produced by the motions of the heart; and this conclusion will be justified and confirmed by an examination of the pulse in the extremities. It will be found, in all healthy subjects, that there is an invariable connection between the sounds and the pulse; every stroke of the latter corresponding very accurately with every repetition of the twin sounds; as, under every variation of circumstances as to loudness, frequency, and so forth, the same exact relation is perceived, it cannot be doubted that there exists an essential physical connection between the causes of the sounds and the pulse.

Rhythm of the Heart.—The first motion of the heart which interrupts the interval of repose is the auricular systole. It is a very slight and brief contractile movement, more considerable in the auricular appendix than elsewhere, and propagated with a rapid vermicular motion toward the ventricle, in the systole of which it terminates rather by continuity of action than by the sucession of a new movement. The ventricular systole commences suddenly and is accompanied with a considerable diminution of the volume of the organ. Synchronous with the systole are the first sounds—the impulse of the apex against the ribs and the pulse in vessels near the heart; in the radials the pulse follows at a barely appreciable interval.

The Diastole Motion.—The systole of the ventricles is followed by their diastole, during which they return, by an instantaneous expansive movement, sensible to the touch and sight, to the same state (with respect to size, shape, position, and so forth), as during the previous interval of repose. This movement, or diastole, is accompanied by the second sound, by an influx of blood from the auricle, by a retractile motion of this cavity most observable at its sinus, and by a retrocession of the apex of the heart from the walls of the chest. Next succeeds the intervals of repose, during which the ventricles remain at rest, in a state of fullness though not of distension, through the whole period intervening between the second and the first sounds; but the auricle remains at rest during the first portion only of the period, the remainder being occupied by its next contraction, with which recommences the series of actions described.

1. The ventricular systole occupies half the time of a whole beat.
2. The ventricular diastole occupies one-fourth or one-third.
3. The interval of ventricular repose occupies one-fourth, or rather less, during the latter half of which the auricular systole takes place.

Causes of the Motions.—The auricles, which are always in a state of fullness, arrive, during the first half of the period of ventricular repose, at the state of distension, by which they are stimulated to contract. The object of the contraction at this movement is to propel a small additional quantity of blood into the ventricles for the purpose of bringing them from the state of fullness to that of distension; an object which could not be accomplished without a contraction, as the blood could not otherwise force its way into the ventricles against the resistance offered by their elasticity. The cavities, then, being brought to the state of distension, are by this stimulated to contract; they expel a greater or less proportion of their contents; in small animals—frogs, for instance—they expel the whole; which is proved by the ventricle being full. In larger animals they do not appear to expel the whole, but the fact does not admit of demonstration. During the act of expulsion, the apex is tilted up, in consequence of the retraction of the ventricles toward the base and upon the auricles, which, in a state of extreme distension, are placed like a fulcrum beneath them.

Causes of Diastole Motion.—The diastole appears to be occasioned by several concurrent causes, viz.:

1. That power of the muscle by which it reverts from the state of contraction to that of relaxation, and in virtue of which it exercises a degree of motion. It may be called elasticity.

2. The distension of the auricles, which is greater at this moment than at any other, as they have been filling during a longer period; namely—that of the ventricular contraction, or half a whole beat.

3. The weight of the ventricles collapsing on the distended auricles underneath them.

4. The width of the auricular-ventricular orifice, which allows the blood to shoot in instantaneously and with great facility.

It is obvious that, as so many powerful causes conspire to promote the influx of the blood, an auricular contraction for this purpose would be superfluous. The escape of blood from the auricles during the diastole causes the slight retraction observable in them at the same moment. The expelled blood being instantly replaced from the vena cava, distension of the auricles recommences, and the same series of actions is renewed.

Causes of the Sounds.—The ventricular systole is the cause of the first sound, by the impulse which it communicates to the blood within it, thereby exciting sonorous vibrations of the fluid. If the sound of the muscular contraction contributes at all to the first sound it can only be in a very slight degree. The ventricular diastole is the cause of the second sound, by the reaction of the walls on the blood, and the consequent production of sonorous vibrations, when its cause is abruptly arrested by the completion of the diastole. Hence this sound is loud, brief and clear. The auricles are not concerned in the production of the two sounds, as they take place when these cavities are motionless; nor do they appear to be productive of any sound, as no third sound is audible.

Auscultation or Sounding.—We now proceed to examine more minutely the phenomena produced by the actions of the heart, in health and disease, with the view to deduce therefrom such diagnostic signs as they are capable of affording. It is hardly necessary to premise that the auscultatory diagnostics of cardiac diseases are founded precisely on the same principles as those which apply to diseases of the lungs.

GENERAL SYMPTOMS OF HEART DISEASE.

Physical Signs.—Disturbance of the functions of the heart must necessarily produce decided effects throughout the whole circulatory apparatus. Appreciable modifications of the arterial pulse of the state of the veins and capillaries show that the circulation is embarrassed. The pulse irregular, unequal and intermittent, as are the pulsations of the heart very

small; but when there is considerable hypertrophy of the left ventricle, the pulse is also hard and vibrating, presenting sometimes a peculiar fremitus, which is most distinct in the carotid, subclavian and radial arteries. In some cases the arterial pulsations succeed one another, stroke by stroke, and this reduplication of the pulse is coincident with a regurgitant murmur heard on auscultating the heart. The insufficiency of the aortic valves is characterized by a bellows-murmur at the base, accompanying the second sound of the heart, and by a bounding pulse with flexuosity of the radial artery.

Symptoms.—When disease of the heart has reached a pretty advanced stage, the existing impediment to the venous circulation is indicated by swelling of the veins near the heart; those, for example, of the neck and face; and this turgescence is particularly obvious in the external jugular veins, where it is sometimes accompanied by undulatory pulsations, analagous to and synchronous with the arterial pulse. This is the venous pulse indicative of hypertrophy of the right ventricle.

Further Symptoms.—In addition to the embarrassment of the venous, there is embarrassment of the capillary circulation, which declares itself by a livid tint of the skin, swelling of the face, puffiness of the eyelids, a bluish color of the lips, and more or less injection of the skin of the extremities.

Palpitation.—As palpitation is under all circumstances dependent on over-excitement of the nerves of the heart, the phenomenon is always essentially the same. The varieties which it presents arise merely from differences in the causes and from the different routes which these causes pursue in order to arrive at and convey their stimulus to the heart.

Blue Skin.—Cyanosis is a morbid appearance which consists in the skin assuming a blue, purple or violet color, especially in those parts where the cutaneous capillary vessels are superficial, as on the cheeks and lips. It is generally accompanied by difficult respiration, palpitation of the heart with diminution of the natural temperature, an irregular or intermitting pulse, and is often attended with dropsical symptoms, the face especially, in addition to the purple color, being bloated and edematous; all these symptoms are much aggravated by any exertion.

PERICARDITIS.

Intensity of the Disease.—Its intensity varies considerably in different cases, being sometimes excruciating and sometimes slight or even wanting.

THE HEART

FIGURE No. 1.

1. External or muscular tunic of the upper right cavity of the heart (right auricle).
2. External or muscular tunic of the left upper cavity (left auricle).
3. External or muscular tunic of the right lower cavity (right ventricle).
4. External or muscular tunic of the left lower cavity (left ventricle).
5. Upper cava vein, or conduit which carries the blood from the upper part of the body to the heart.
6. Under cava vein, or conduit from the lower part of the body.
7. Pulmonary artery.
8. Aorta.
9, 10. Coronary arteries.
11. Division seat between the right and left ventricles.
12. Series of vessels for feeding the external part of the heart.
13. Position of the valves of the heart.

FIGURE No. 2.

1. Back part of the right auricle.
2. Back part of the left auricle.
3. Back part of the right ventricle.
4. Back part of the left ventricle.
5. Opening of the upper cava vein.
6. Aorta.
7. Pulmonary artery.
8. Lower cava vein.
9. Vessel for feeding the walls of the heart.
10. The same.
11. Position of the valves of the heart.

FIGURE No. 3.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Parts and vessels of the heart as demonstrated in Figures Nos. 1 and 2.
11. Windpipe (larynx).
12. Cartilages and seat of the vocal cords.
13, 14. The lungs in their upper part called the apex.
15. Branches, in the lungs, of the greater blood-vessels.
16, 16. Base of the lungs, showing the exterior surface.

FIGURE No. 4.

1. Cavity of the auricle.
2. Cavity of the ventricle.
3,3,3,3. Muscular tunics.
4. Tricuspidal valve.
5. Pulmonary artery.
6,6,6. Inner tunic of the heart.
7. Mitral valves.
8. Auricular-ventricular opening.
9. Dividing wall.
10. Aorta.
11. Cava vein.

FIGURE No. 5.

1,2,3. Pericardium.
4. Muscles of the wall of the heart.
5. Plaits of the lining of the heart.
6. Tendon cords.
7. Fleshy columns.
8. Seat of the valves.
9. Opening facing the auricle.
10. Walls surrounding the mitral valve.
11. Mitral valve.
12. Semilunar valves.

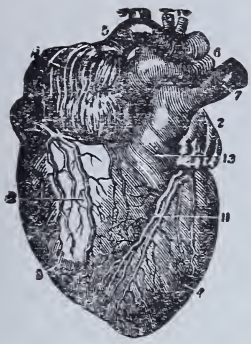


FIG. 1.—Front vertical view of the heart with its injected veins.

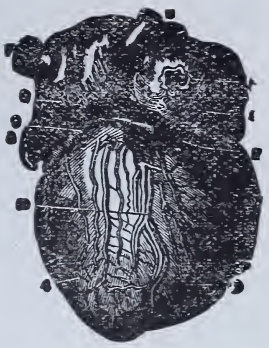


FIG 2.—Back vertical view of the heart with its injected veins

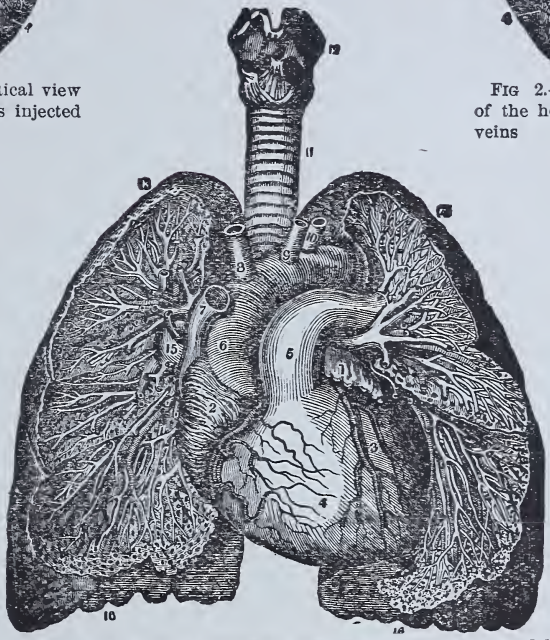


FIG. 3.—View of the bronchia and veins of the lungs, exposed by dissection, as well as the relative position of the lungs to the heart.

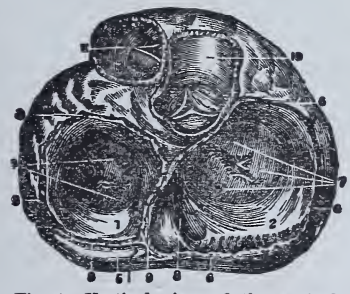


Fig. 4.—Vertical view of the auricula-ventricular and arterial valves of the heart.

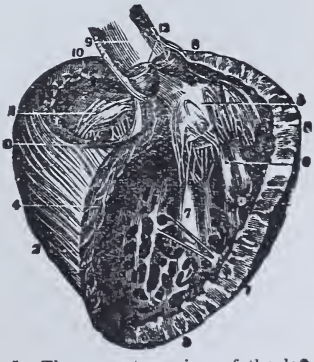


Fig. 5.—Three-quarters view of the left ventricle after removing front walls.

THE HEART.

For an explanation of the illustrations see text on opposite page.

There is also more or less tenderness on pressure over the region of the heart, and its action is notably increased. With these local symptoms are associated those pertaining to the system at large which accompany symptomatic fever. As the affection is almost always developed in connection with other diseases, the symptoms of the latter are of course combined with those of the former.

Diagnosis.—The diagnosis or recognition of pericarditis has been rendered prompt and positive by means of auscultation and percussion. Soon after the attack the exudation of fibrine occasions a friction sound with the heart's movements, and this is proof of the existence of the disease. Afterward, when considerable liquid has been effused into the sac, the friction sound may cease, but it is practicable to determine the presence and the quantity of liquid within the sac by physical signs, which are obtained only by auscultation and percussion. The danger in cases of pericarditis depends, other things being equal, on the intensity of the inflammation, the quantity of exuded fibrine and the amount of effused fluid. Aside from these conditions, much depends on the diseases with which it is associated.

Symptoms.—When developed in connection with rheumatism, it ends in recovery in the majority of cases; but occurring in connection with diseases of the kidneys, with pleurisy or pneumonia, and in cases of pyemia, it ends in death much oftener than in recovery. When death is not sudden, the disease destroys life by slow asthenia or exhaustion.

As a rule from the outset we have acute inflammatory fever, a pungent, burning, lancinating pain in the region of the heart, shooting to the left scapula, shoulder, and upper arm, but rarely descending below the elbow, or even quite to it. The pain is increased by full inspiration, by stretching the left side, and especially by pressure between the precardial ribs, and by forcing the epigastrium upward underneath the left hypochondrium. When the inflammation is only subacute the pain is more or less dull, and does not lancinate. There is inability of lying on the left side, and sometimes in any position but one, which is most commonly on the back, dry cough, hurried respiration, palpitation of the heart, the impulse of which is sometimes violent, bounding and regular, though its beats may at the same time be unequal in strength, at other times it is feeble, fluttering and irregular, pulse always frequent, and generally, at the outset, full, hard, jerking and often with a thrill.

Causes.—The most frequent causes are blows or excessive pressure in the pericardial region, inflammation propagated from the lungs or

pleura, and far above all, rheumatism. From this cause children and young persons suffer much oftener than others. The remaining causes are those of inflammation in general, viz., cold, febrile excitement, and so forth.

Treatment.—As regards treatment, acute pericarditis claims in general the measures indicated in other inflammatory affections. The antiphlogistic treatment, in as energetic a form as circumstances will allow, should be employed with the utmost promptitude. The loss of a few hours at first may be irretrievable, and hence hesitation and indecision may seal the fate of the patient. These measures, however, are in many cases to be modified by the circumstances pertaining to the diseases with which this is associated.

Strength of the Remedies.—The strength of the remedies employed must in each case be apportioned to the vigor of the patient's constitution; but the object is the same in all, expeditiously to prostrate the action of the heart, and for a time to keep it prostrate by preventing the re-establishment of reaction. If this object can be accomplished for the first twenty, thirty or forty hours, the disease frequently does not rally, but remains perfectly under the control of remedies.

Additional Treatment.—In addition to the above measures diluent cooling drinks—as four scruples of bitartrate, or two of nitrate of potassa in a quart of water, and flavored at pleasure—should be allowed in unlimited quantity, in order by diluting the blood to render it less stimulant to the heart. Nauseating doses of tartrate of antimony, as one-sixth to one-eighth of a grain every two hours, may be employed with advantage. Colchicum often proves useful, especially so when the disease is of rheumatic origin. Calomel, trusted still by some and abused by others, may be confined to open asthenic cases in previously good constitutions. Where the rheumatic diathesis is marked, alkalies will be indicated. Carbonate or bicarbonate of potassium, or bicarbonate of sodium, may be given in scruple or half doses, with as much of rochelle salts, three or four times a day.

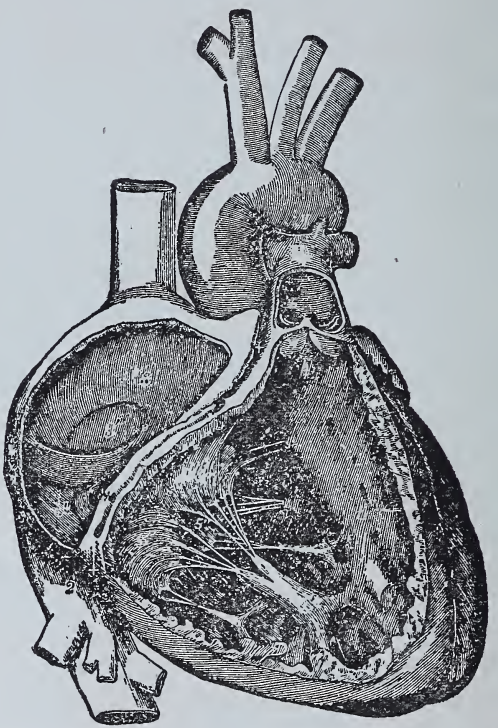
Continued Treatment.—Should pain continue in the advanced stages of the disease, blisters may be resorted to, and repeated in quick succession, with great advantage. For the stage of effusion we have occasionally found a third or a fourth necessary, combined with the use of diuretics, as squills, juniper, sps. ether, nit., and so forth, varied and continued until absorption occurs. Tonics will often promote the same end.

Convalescence.—An individual who has recently been affected with pericarditis is peculiarly liable to a recurrence of it, especially if it has

resulted from rheumatism, and if the reparation has been incomplete. In this case, should rheumatism return, it rarely fails to be accompanied with a renovation of the pericarditic symptoms.

Diet.—A very spare unstimulating diet and extreme tranquillity must be imperatively enjoined until the action of the heart has become perfectly and permanently natural. This should consist wholly of the weakest slops, as barley, water gruel, weak tea, arrow root, and so forth.

Chronic Pericarditis.—Chronic pericarditis may be a sequel of the acute affection, or the inflammation may be subacute from the first. In some cases the inflammation continues with an abundant exudation of lymph, agglutinating the inner surfaces of the sac, and proving fatal by slow exhaustion. In other cases a large accumulation of liquid takes place, amounting to several pounds in weight, and to the exhaustion incident to the persistance of the inflammation is added the compression of the heart thus occasioned. In both varieties of the disease, as a rule, proves fatal sooner or later.



Cavities of Right Side of Heart, with their Valves.

Treatment of Chronic Pericarditis.—A rapidly depressing case of pericarditis, with cold, blue skin and feeble, irregular pulse, will require, instead of the above, a supporting or stimulating treatment from the first; with dry cups and blisters instead of local or general bleeding; and quinine, ammonia and whiskey, instead of sudorifics or laxatives.

ENDOCARDITIS.

Signs of the Disease.—Inflammation of the internal membrane of the heart. In this affection the inflamed membrane is in contact with the

blood contained within the cavities of the heart; hence, although fibrinous exudation takes place as in pericarditis, the exuded lymph is in a great measure washed away from the membrane and carried into the circulation. A portion, however, adheres to the membrane, roughening the surface in contact with the blood, and giving rise to an abnormal sound (an endocardial or bellows murmur), which is an important physical sign of the disease. Moreover, upon the little masses of lymph which adhere to the membrane, coagulated fibrine from the blood contained in the cavities of the heart is apt to be deposited, and in this way are produced the so-called vegetations or warty growths, which being sometimes detached and carried into the arteries with the current of the blood, are arrested in vessels too small to allow of their further progress, become fixed and occasion an obstruction which may lead to hemorrhage (hemorrhagic infarctions), and to the impairment of nutrition within a circumscribed area beyond the point at which the obstruction is seated. These movable plugs or emboli, as they are termed, play an important part in affections proceeding from disturbance of the circulation and nutrition in different organs of the body, more especially the brain.

Local Effects.—The local effects of endocarditis are also of much importance as laying the foundation for progressive changes, especially in the valves of the heart, constituting what are called valvular lesions. The inflammation in endocarditis is generally limited to the left side of the heart; that is, to the endocardial membrane lining the left ventricle and the left auricle.

Causes.—Like pericarditis, this is very rarely a primary disease, and in the great majority of cases it occurs in connection with acute articular rheumatism. It is evidently due to the same internal agency which in rheumatism causes the inflammation within the joints; this agent, being a morbid principle in the blood, is supposed to be lactic acid.

Diagnosis.—Its development is attended with little or no pain or other subjective symptoms referable to the heart; the diagnosis rests wholly upon physical evidence attained by auscultation. The roughening of the endocardial membrane within the left ventricle causes, as already stated, an adventitious sound or murmur, and the production of this murmur, while a patient is under observation, constitutes the proof of the presence of the affection.

Symptoms.—The symptoms produced are blueness and coldness of the skin, the result of the disease affecting the valves of the heart so as to render them more or less incompetent to perform their functions, and

HUMAN INTERNAL ORGANS.

THE LUNGS.

Upper Left-Hand Plate.—This handsome plate shows, at the top, the windpipe (trachea) entering the lungs. It divides into two branches, one for each lung, and each branch subdivides, so as to carry air to every part of the lung.

Lobes.—The plate shows the two great parts of the lungs, right and left lobes. These are filled with the air cells. Notice in the lobes the immense number of veins which form the circulatory system of the lungs.

Heart.—The heart is seen in its true position, to the right of the centre.

Pulmonary Vein.—To the left of the centre is seen the great pulmonary vein, carrying the lung-blood to the left auricle of the heart.

Pleura.—The pleura membrane is seen surrounding the entire lungs and walling them in.

THE LIVER.

Upper Right-Hand Plate.—The liver is the largest gland in the body. Situated on the right side, and partly covers the stomach.

Lobes.—The plate shows its two lobes on upper surface and five on under surface.

Vessels.—The entire circulatory system is shown—portal vein, hepatic artery, hepatic duct, lymphatic and smaller veins. To the left, in pear-shape, is the gall bladder.

THE HEART.

Lower Left-Hand Plate.—The plate shows the cone-shaped heart, situate in the chest, between the lungs, its apex toward the left. Though supplying blood to the whole body, it yet has its own circulation, as seen by its veins.

Cavities.—It has four cavities, an auricle and ventricle on each side. The right auricle receives the venous blood and pumps it into the right ventricle. The right ventricle throws its blood into the left auricle. The left ventricle pumps it into the aorta and thence through the body. The upper section of the plate shows the aorta and the great pulmonary vein.

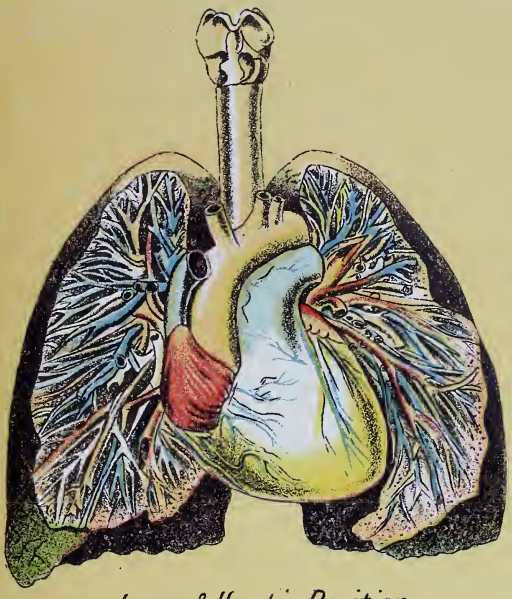
THE STOMACH.

Lower Right-Hand Plate.—The plate shows the stomach when one is in a reclining position.

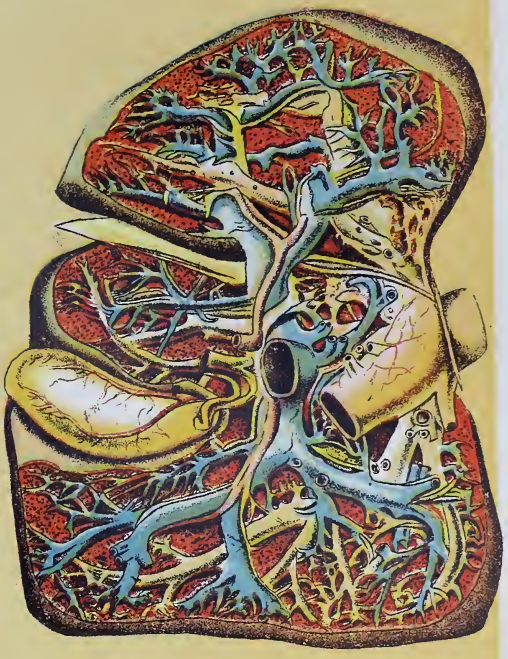
Veins.—The numerous veins show how well it is nourished.

Liver.—To the left is the liver. Above it is the opening through which food passes from the gullet (œsophagus). At the opposite end is the pyloric gate, through which the partly digested food passes into the duodenum (twelve-inch bowel).

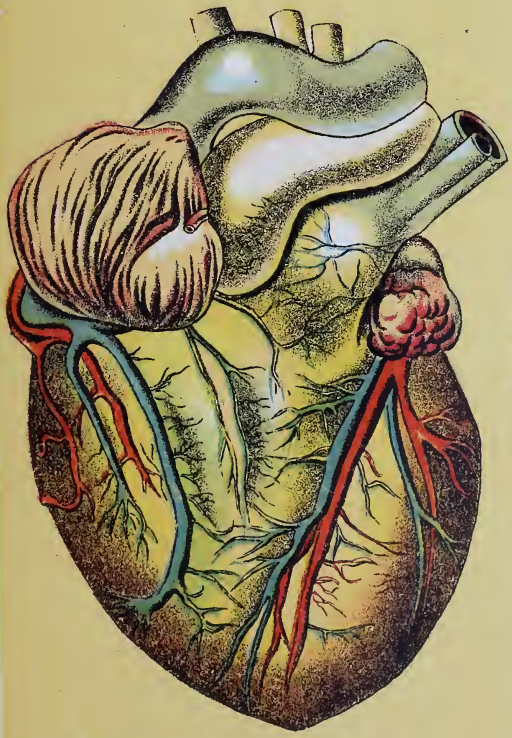
Muscles.—Around the stomach, in brown and white, are seen the powerful abdominal muscles. The white represents streaks of fatty matter. The stomach is usually about twelve inches long and four inches in diameter.



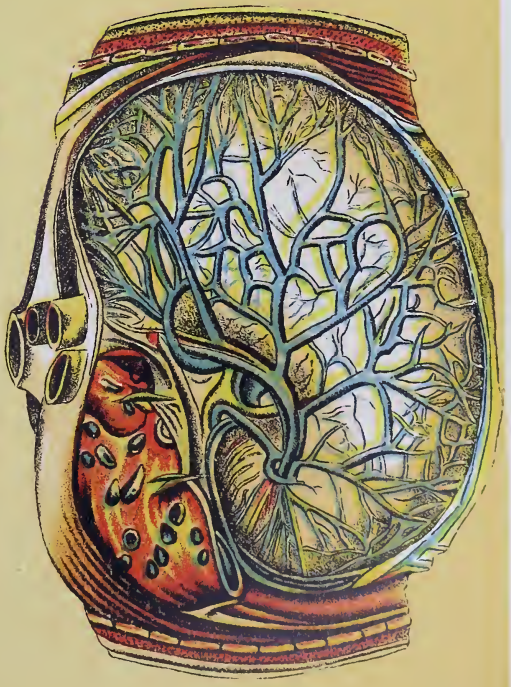
Lungs & Heart in Position



Section of Liver



The Heart Showing The Great Arteris.



The Stomach - Front view Figure in Reclining Position.

Human Internal organs.

diminishing the size of the mitral or aortic orifice so as to produce more or less obstruction to the passage of blood. Obstruction of the flow of blood through the orifices within the heart, and regurgitation, lead to enlargement of the organ and to various morbid effects in other organs; indistinctness of the heart sound, feebleness and irregularity of the pulse, nausea and vomiting, anxiety of expression and fainting.

Treatment.—In every case the important question is, less the state of the particular valves than the amount of interference with the functional action of the heart. In young persons remarkable recoveries sometimes take place. In other instances, adaptation of the heart itself, and of the general system by degrees, is effected, so that quite good health, and even capacity for exercise, may be attained, while the physical signs of the local organic change remain. Sudden death is less common in heart disease than is popularly supposed.

The Circulation.—The circulation should be kept as tranquil as possible by a quiet life and a moderate unstimulating diet. The food, however, should be rather nutritious, comprising a little animal food or soup twice a day, in order to keep the muscular system in general, and that of the heart in particular, in tone. The same may be promoted by a clear, bracing, dry air. The general health and strength may likewise be improved by the occasional exhibition of bitters, mineral acid and chalybeates, with aromatics. The stomach, in particular, should be kept in good order, as its derangements, even a little flatulence or acidity, have a surprising effect in disturbing the action of the heart. The same may be said of the biliary secretion, when there is an unequal distribution of venous power, indicated by hysterical symptoms, and so forth, antispasmodics will be found useful.

Value of a Bath.—Attacks of dyspnœa are best relieved by immersing all the extremities in warm water, a blanket being thrown around the patient to promote perspiration, and fresh, cool air being admitted to satisfy the craving for breath. While this is being done he should take an antispasmodic draught, composed of either laudanum, camphor, ammonia, and asafetida, combined according to circumstances. It may be repeated two or three times, at intervals of from half an hour to an hour, according to circumstances.

Diet.—For the avoidance of attacks the more important of the measures of management relate to a proper regulation of the habits of life as regards diet, exercise and so forth. While excessive muscular exercise is to be avoided, such an amount as is taken, without discomfort, may be

highly useful by improving the general condition of the system; while excesses in eating and drinking are hurtful, a deficient alimentation is not less so. In brief, the great end of treatment is to render the system tolerant of the lesions as much and as long as possible, and this end is promoted by such a course of management, hygienic and medicinal, as conduces to the general welfare of the economy

ADDISON'S DISEASE.

Nature.—Certain forms of general anemia which are neither attributable to excessive antecedent hemorrhages, nor to profuse or long continued intestinal fluxes, and which cannot by symptoms be connected with any diathesic state or marsh miasmatic influences, forms of general anemia, in fact, which appear to supervene under the influence of non-recognizable causes, in which besides the debility and languor of the patient, are characterized by a bronzed hue of the integuments, and which is most strikingly apparent on the skin of the hands, penis, groin, scrotum and axilla.

It has been termed by Addison the bronzed disease.

Symptoms.—The malady begins slowly, and its existence is not at first perceived. The patient has difficulty in fixing with precision the date at which he experienced its earliest symptoms. Its first manifestations are general discomfort, an enfeebling of the physical and moral faculties, and a state of real languor. The arterial pulsations are small and feeble, the pulse full, soft and easily compressed. The appetite is capricious, the patient showing repugnance to animal food, or a diminished appetite. At first digestion proceeds in a normal manner; at a later stage this function is disturbed by intractable vomiting. This symptom is accompanied by pain, or at least by a painful sensation in the epigastric region. The patient wastes away, and yet the most minute examination fails to discover any sign of organic change sufficient to account for the great disturbance of health and extreme anemia which exist. Finally there is a state of extreme debility.

Treatment.—In the treatment, having no specific remedy, we are obliged to direct our measures against the symptoms of anemia; ferruginous medicines, preparations of cinchona, and a tonic regimen are indicated. Decided advantage has followed the use of a combination of glycerine, in two-drachm doses, with fifteen or twenty minims each of chloroform and tincture of chloride of iron.

OBSTRUCTION OR OCCLUSION OF THE ARTERIES

EMBOLISM.

Symptoms.—When the right half of the heart has received an embolus and the pulmonary artery is obstructed, collapse of the lungs, partial or entire, follows. Pleurisy, hemorrhage or bronchitis may also occur, or the symptoms may be great anxiety and dyspnœa, with reduction of the temperature of the body, a systolic murmur may be heard on auscultation; the rhythm of the heart becomes irregular, and pulsation of the jugular veins may be noticed. Giddiness may be present, with blueness and edema of the hands, feet, or both. Where emboli have become broken up and decomposed, septicemia results, commonly known as pyemia.

Treatment.—The objects we should have in view in the treatment of a vessel occluded by an embolus are, to favor the venous circulation through the limb by its elevation, and to establish the arterial collateral circulation by maintaining the warmth of the limb by means of cotton carefully wrapped round it over oil lint. Pain can be relieved by sedatives, while the powers of the patient are to be maintained by nutritious diet, by stimulants carefully administered and by tonics. When gangrene has taken place the parts may be covered with some antiseptic material, as carbolic acid in a watery or oily solution, one part to thirty, or with powdered chloral. When the line of demarcation has formed and the gangrenous part can be removed by amputation, such an operation may be performed.

GOITRE (GRAVE'S DISEASE).

Goitre may be simple or exopthalmic. Simple goitre is a local affection with only symptoms such as dyspnœa, or the cough as of a broken-winded horse and difficulty in breathing on slight exertion. Exopthalmic goitre is a disease of the nervous system characterized by protrusion of the eyeballs, enlargement of the thyroid gland and palpitation of the heart, a peculiar thrill in the blood-vessels and a general deterioration in muscular and brain power. The veins and arteries of the thyroid glands are enlarged. As a rule the development of the disease is gradual. The goitre is elastic and rather soft. The protrusion of the eyeballs follows the swelling of the gland. The disease is more common with women than with men.

Recovery occurs in a fair number of cases, but the course is slow. Although occasionally sporadic, it is essentially an endemic disease in cold and damp countries, as in the deep valleys of the Alps, the Pyrenees, the North American Rockies, the Cordilleras of South America, and the chalky districts of Derbyshire, England.

Treatment.—Simple goitres are to be treated on ordinary principles, viz., by attention to the general health, the inhalation of fresh air and by tonic medicines. Filtered or distilled water should always be taken, more particularly in districts where chalk, lime and magnesia abound. Iodine has always been held in high repute in this disease, in the form of compound solution of iodine, three drops in a glass of milk, three times a day. For some years we have employed tonics alone by the mouth, and have ordered the air in the room to be kept iodized by means of solid iodine put into a box with a perforated lid; the metal thus evaporates steadily into the room where the patient sits and sleeps, and in this way it becomes absorbed.

ANEURISM OR BLOODY TUMOR.

Causes.—A low form of inflammation of the arterial walls is without doubt the most common predisposing cause, while over-action of the heart and circulation is the exciting one. Direct injury to an artery (traumatic) is an occasional cause.

Symptoms.—The early symptoms of aneurism are very uncertain. It often happens that the patient's attention is first directed to some swelling, although it may be only that of local throbbing, some weakness or stiffness of an extremity, or some nerve pain preceding the discovery of the disease; yet such symptoms are not constant. When, however, you are consulted for pain which shoots down the course of a nerve running in contact with a large artery, you should allow the thought of aneurismal pressure to pass through your mind, and, when this is associated with the presence of a tumor connected with the vessels, the suspicion of its being aneurismal should be excited. If this tumor be soft and pulsating, and becomes tense on the application of pressure to the trunk of the artery on the distal side, and placid, non-pulsatile and vanishing on pressure in the vessel below, the chances of its being aneurismal amount almost to a certainty. Should it expand again readily on the removal of pressure, this expansion is accompanied with a peculiar thrill on the readmission

of blood into the sac, with a bellows murmur or aneurismal bruit, synchronous with the pulse.

Treatment.—The spontaneous cure of an aneurism is caused by the coagulation of the blood in the sac; how to induce this coagulation by natural processes is our aim; therefore, it is necessary to have a feeble circulation through it; for this purpose, rest in the recumbent position is an essential point of practice, and should be maintained in every case. When the force of the circulation is too strong and the powers of the patient are good, bleeding under this circumstances is not only rational but scientific. Medicines do not seem to have much influence in the coagulating process, though the acetate of lead has been found useful and iodide of potassium. The local treatment is based on similar principles, the aim being to diminish the circulation through the sac. This may be effected by the following means, viz., by compression in one of its forms of the artery above the aneurism, indirect; by compression of the aneurism itself, direct; by the Hunterian operation, viz., the application of a ligature to the artery on its cardiac side; by imitating the rare natural process of closure of the artery on its distal side by the application of a ligature, or by pressure, or by the artificial production of an embolic plug, by Fergusson's method of manipulation, and last of all it may be laid open and both ends tied. The treatment by electro-puncture, injection, and the introduction of some foreign body into the sac may be adopted in exceptional cases.

PHLEBITIS OR INFLAMMATION OF THE VEINS.

Symptoms.—The most prominent symptom of an obstructed vein is edema of the parts below the obstruction, some fullness of the superficial veins, local pain and tenderness; constitutional disturbance of variable degrees of severity generally preceding. When superficial veins are involved the symptoms may be chiefly local, but in the case of deep veins constitutional disturbance is certain to accompany local action. Among the superficial veins the saphena of the leg and thigh is most commonly affected, and is often a sequelæ of a varicose condition. Under these circumstances the tortuous, dilated, indurated vein becomes a marked object, set as it were in a frame of hardened inflamed skin and a cellular tissue.

Treatment.—The two great indications for treatment in these cases are to favor venous circulation of the part, and to improve the general condition of the patient.

THE ARTERIES

FIGURE No. 1.—Arteries of the palm of the hand and front of forearm.

3. Deep part of the raised pronator of the radius.
4. Long supinator muscle.
5. Long flexor of the thumb.
6. Square pronator.
7. Deep flexor of the fingers.
8. Cubital flexor of the wrist.
9. Annular ligament, with the tendons that pass under the centre of the palm of the hand; the member is on the tendon of the long palmary muscle divided near its insertion.
10. The brachial artery.
12. Radial artery.
13. Recurring radial artery joining the end of the upper deep one.
14. Superficial veins.
15. Cubital artery.
16. Superficial palmary arch from which spring digital branches to three and one-half fingers.
17. Magna artery of the thumb and radial artery of the index.
18. Back cubital recurring artery.
19. Front interosseous artery.
20. Back interosseous artery passing through the interosseous membrane.

FIGURE No. 2.

1. Primitive carotid artery dividing itself into carotid external and carotid internal.
3. Occipital branch to the back part of the skull.
4. Upper hyoides artery.
5. Lower pharyngeal artery.
6. Masseter artery.
7. Submental artery.
8. Lower coronary artery.
9. Upper coronary artery.
10. Deep branch.
11. Back cervical artery.
12. Continuation and fold of the occipital.
13. Descending branch for muscles of the neck.
14. Posterior auricular.
15, 15. Temporal artery.
16. Parietal branches.
17. Frontal branches.
19. Orbitary branches.
20. Subclavian artery.

FIGURE No. 3.

Thoracic aorta.

The three branches from left to right are the unnamed ones.

The primitive left carotid and the subclavian left one.

The small branch in the curve is the bronchial one.

FIGURE No. 4.

1. The liver.
2. The stomach.
3. Upper gut.
4. Pancreas.
6. Great mesenteric artery.
7. Gastric branch.
8. Spleen.
9. Pyloric branch.
10. Pancreatic branch.
11. Hepatic artery.
12. Duodenal branch.
13. Cystic artery.
14. Branches to the stomach.
15, 16. Spleenic arteries.
17. Gastro-epiploic artery.
18. Descending aorta.
19. Great mesenteric artery.

FIGURE No. 5.

1. Cheek arteries.
2. Cœliac axis.
3. Gastric artery.
4. Hepatic artery dividing itself into right and left branches.
5. Spleenic artery.
6. Supra-renal artery on right side.
7. Right renal artery, which is longer than the left.
8. Lumbar arteries.
9. Upper mesenteric artery.
10. The two spermatic arteries.
11. The lower mesenteric.
12. The middle sacras.
13. The common iliac.
14. Internal iliac of the right side.
15. External iliac.
16. Epigastric artery.
17. Circumflex iliac artery.
18. Femoral artery.

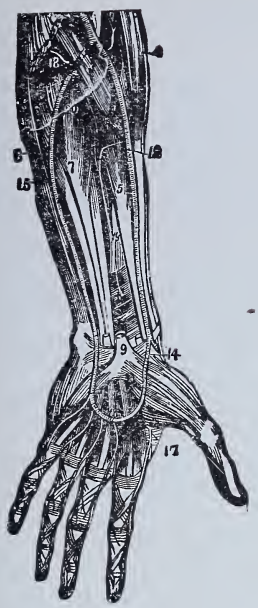


Figure No. 1.

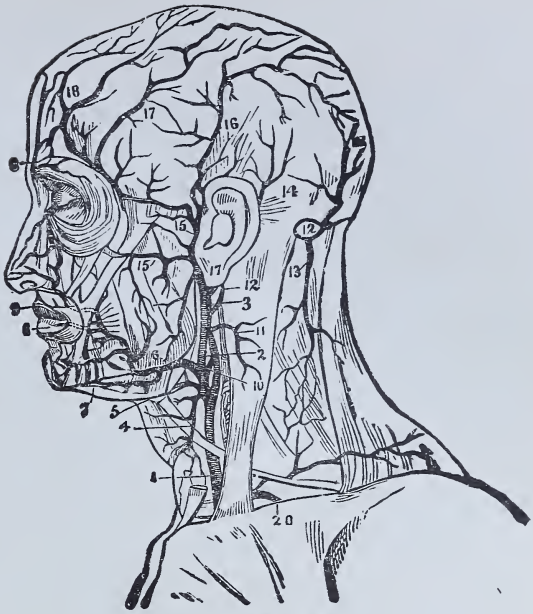
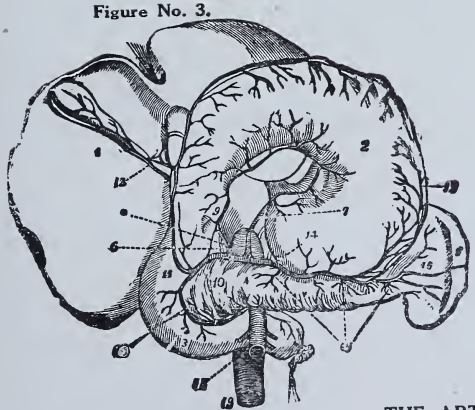


Figure No. 2.

Figure No. 3.



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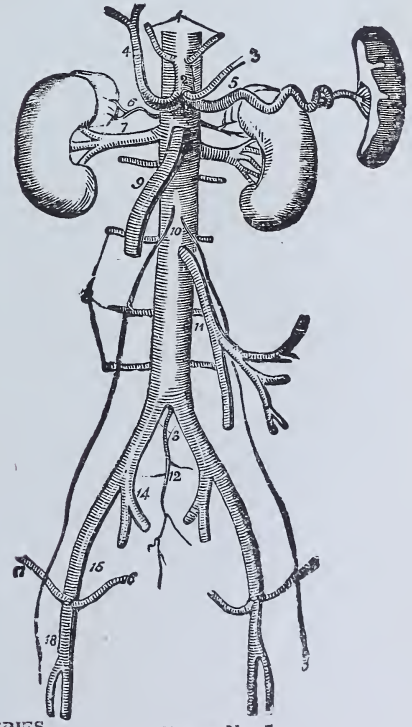


Figure No. 5.

THE ARTERIES.

For an explanation of the illustrations see text on opposite page.

The first is attained by elevation of the limb, the foot being raised higher than the hip, and by the application of warmth. The second can be carried out by the administration of a simple nutritious diet, tonics, such as quinine, bark or iron, and stimulants carefully adjusted to the wants of the individual case.

Pain must be allayed by both local and general means, as poppy fomentations, and the internal use of sedatives. Leeching should never be resorted to, nor the use of mercury. When suppuration appears it must be dealt with on ordinary principles, but it is well, as a rule, to evacuate it as soon as it has declared itself.

INFLAMMATION OF THE LYMPHATIC VESSELS AND GLANDS.

Symptoms.—1. The absorbent glands with their ducts are liable to inflammation, adenitis or angeioleucitis, and this action is the result of the absorption of some septic material. It is almost always associated with a wound, punctured or open-inflamed suppurating, healing; with some point of irritation or suppuration, even a papule or pustule; with some centre from which morbific elements may be taken up. In what is called a simple wound the inflammation of the absorbents may be acute, but in poisoned it is violent and diffused. The inflammation always follows the course of the absorbents, leading from the centre of absorption toward the glands; that is, toward the body, and it never spreads backward. When it has reached the glands, the diseased action ceases to spread, that is, it expends its force upon the group of glands in which the absorbents naturally end, and does not extend through another series of absorbents to a second group. When pyemia follows or complicates the case, it may be open to question whether the poisonous fluid circulating in the lymphatics has not been allowed to pass into the blood through its usual channels, viz., through the inflamed glands onward, and set up inflammation in the tubes and glands, was taken directly into the blood through the venous channels, thus giving rise to blood-poisoning.

2. Pain and tenderness in some of the glands are generally early symptoms, and with these, or some following them, will be seen a band of redness varying in diameter, leading from the wound or infecting centre toward the gland. This red line may be continuous or interrupted; it may be a thin streak or a broad stripe of redness, and in some instances so radiate into the surrounding tissues as to simulate erysipelas. The whole line of redness is very painful, and with these local symptoms there

will also be some febrile disturbance. The red lines follow the course of the absorbents and not of the veins.

Treatment.—When any indications of absorbent inflammation show themselves the wound or sore should be well cleansed and any collection of pus let out. The effected limb should be raised, the foot, when involved, brought higher than the hip; the hand or elbow than the shoulder, and warm poppy fomentations should be applied along the whole course of the lymphatics up to the group of glands in which they terminate. As soon as suppuration appears the abscess must be opened, whether this follows directly upon the inflammation or subsequently. A saline purge should be administered; sedatives should be given to allay pain. When suppuration has taken place tonics may be administered. In chronic cases, where induration in the track of the ducts remains, mercurial ointment and friction are sometimes valuable.

DISEASES OF THE DUCTLESS GLANDS.

The glands without any outlet in the body are three in number, namely: the thyroid, situated in the front of the neck; the spleen, located in the left side below the heart, and the supra-renal capsules, which are placed one over each kidney, deep in the loins on either side of the spinal column. Although the functions of these organs are still undetermined, many of their diseases are well known.

DISEASES OF THE SPLEEN (SPLENITIS).

Symptoms.—Diseases of the spleen may be acute or chronic. The acute symptoms are a sensation of cold and partial rigor, a feeling of weight, fullness and pain in the left side extending to the left shoulder, increased on pressure and coughing; thirst; some degree of nausea; dry cough with the usual symptoms of pyrexia. Wandering pains in the limbs, sometimes ending in collections of pus under the integuments of the thigh, arm, and so forth, are not uncommon in chronic splenitis. In the latter periods of the disease the debility and emaciation become very great; the complexion darkens and the appetite fails. Hectic, more or less violent, comes on with diarrhœa or vomiting of unconquerable pertinacity and blood is frequently discharged both upward and downward.

There is a simple enlargement of the spleen from mere temporary congestion, as when brought on by sudden mental emotion or by oscillations of the circulation from internal causes. In temperate climates the

more permanent enlargement or hypertrophy of this organ, not being accompanied by the same violence of constitutional disease as in the latter, is usually of a passive character and is owing to relaxation of fibre. The most frequent causes of enlarged spleen are ague (ague cake) and remittent fever. The most characteristic symptoms are a sense of weight in the left side with or without evident swelling; inability to lie on the right side with ease; debility; disordered stomach; dry cough and absence of fever.

Treatment.—The indications of treatment are: first, to remove the cause; secondly, to restore the organ to its natural condition; and thirdly, to improve the general health. If ague be the exciting cause it must be combated by appropriate remedies, warm and brisk purgatives should be given once or twice a week so as to affect the upper bowels. Mercurials should be omitted. The bowels being kept more open than ordinary, the nascent irritative stage having gone by and the case being strictly passive, tonics are to be had recourse to and especially the acids with preparations of iron.

Leucocythemia.—Leucocythemia or white-cell blood is a disease of the circulating fluid often associated with enlargement of the spleen and supposed to be caused in part by the morbid condition of that organ. The great characteristic of this malady, as its name indicates, is the preponderance of white corpuscles in the blood.

Symptoms.—The general or constitutional symptoms are a slowly progressive anemia, weakness and emaciation, with incapacity for exertion, shortness of breath and digestive derangements. The bodily temperature is often somewhat raised and sometimes persistently elevated. The urine may be normal in appearance but less urea appears to be secreted in it. In the later stages there is a tendency to dropsy and to hemorrhage from various surfaces, especially the mucous membranes. The only certain mode of determining this remarkable disease is by a microscopic examination of the blood.

Treatment.—No specific for leucocythemia has yet been discovered. The constitution requires generous support, if not stimulation. Tincture of the chloride of iron in doses of ten or fifteen drops three times a day sometimes acts admirably.

DILATATION OF THE HEART.

Symptoms.—Dilatation of the heart is indicated, upon physical exploration, when, with extended impulse of the heart we have dullness on

percussion beyond the usual limits. If true hypertrophy or muscular thickening be present the impulse is very forcible as well as extended. The heart-sounds are apt to be clear, though not loud, in attenuated dilatation; rather loud, but dull-toned, in enlargement with thickening. It is most often induced by valvular obstruction or regurgitation, compelling unusual and continued efforts to sustain this circulation. Sometimes, however, it is more truly idiopathic, following causes of overaction of a heart otherwise sound, thus, violent exercise, self-abuse, coffee, tobacco, alcohol, and so forth, are, with good reason in predisposed cases, accused of producing it.

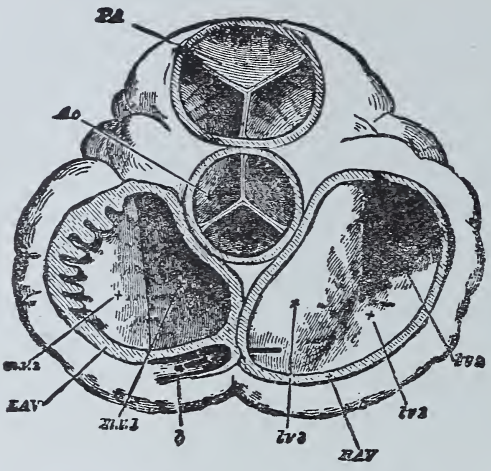
Treatment.—In the treatment avoidance of such exciting causes and particularly of violent exercise, alcohol and venery, is the main principle. Robust or plethoric patients may bear and be benefited by occasional leeching or cupping over the heart. Acetate of lead as an astringent cardiac sedative has proved useful in the dose of one grain thrice daily, with care to avoid saturnine poisoning. Digitalis here acts as a tonic to the heart, through ganglionic influences, lessening rapidity of action when that depends on debility, and veratrum viride as a sedative and palliative in violent acceleration of the pulse, as in muscular hypertrophy and in some forms of palpitation.

ENLARGEMENT OF THE HEART.

Symptoms.—Enlargement of the heart and its extent are easily determined by means of physical signs, palpation and percussion. By the touch it is found that apex beat is more or less lowered and carried to the left of its normal situation. Between the apex and the base of the organ are found impulses not perceptible in health. By percussion the boundaries of the organ are readily ascertained in the great majority of cases. The vocal resonance also, as heard with the stethoscope, enables the physician to define the limits to which the organ extends. Palpitation and auscultation furnish signs by which predominant hypertrophy may be differentiated from dilatation. If hypertrophy predominates the impulses of the heart as felt by the hand are strong, and often there is a heaving movement extending over the region of the heart. The first sound of the heart, over the apex, is abnormally loud, long and booming. On the other hand, if dilatation be considerable or great, weakness of the organ is denoted by feeble impulses and by diminished intensity, together with shortness and

a valvular quantity of the first sound of the heart in the situation of the apex.

Treatment.—In addition to purgatives we have seen the most decided advantage result from diuretics, and not only when there was dropsy, but equally when there was none. Their mode of operation appears to be ultimately the same as that of purgatives, viz., they drain off the serous portion of the blood. We have found many patients, conscious of the benefit which they derived from this class of remedies, to be in the constant habit of taking cream of tartar, brown tea and other similar popular medicines. One patient, affected with contraction of the mitral valve to the size of an ordinary pea, by these means warded off dropsy beyond the slightest edema of the feet for ten years. When decided dropsy appears it must be combated by the most efficient diuretics, the acetate, or tartrate and nitrate of potash, squill, digitalis, spirits of nitre, ether, and so forth, as no class of remedies is more variable and uncertain than this. When one fails another should be resorted to.



Bird's-Eye View of the Valves of the Heart.

Diet.—The treatment consists of a highly nutritious diet, into which fatty articles should enter sparingly, together with the employment of hygienic measures and remedies designed to give tone to and to invigorate the heart.

CHRONIC VALVULAR DISEASE.

Diagnosis.—The diagnosis of valvular disease has been rendered very complete by means of auscultation. With very rare exceptions it gives rise to adventitious sounds or murmurs, the characters of which, as regards their situation, their transmission in different directions, and their relations to the heart sounds, enable the physician not only to determine their existence but to localize them and to distinguish between those which involve obstruction and regurgitation. When valvular disease has ad-

vanced sufficiently to produce obvious symptoms referable to either obstruction or regurgitation, or to both, they will destroy life sooner or later.

Whether the disease of the valves be cartilaginous, osseous, or consist of vegetations, the general symptoms are the same if the degree of contraction be equal. The general symptoms are cough, copious watery expectoration, dyspnœa, orthopnœa, frightful dreams and starting from sleep. Edema of the lungs, pulmonary apoplexy, passive hemoptysis (sputa stained with dark or grumous blood), turgescence of the jugular veins, lividity of the face, anasarca, injection of almost all the mucous membranes, passive hemorrhages, especially of the mucous membranes, engorgement of the liver spleen, and so forth, and congestion of the brain with symptoms of oppression, sometimes amounting to apoplexy.

The preceding illustration represents a hardened section of the heart, cut transversely across the organ so as to show how the pocket-like valves come together in the middle of the openings in order to close those orifices. At LAV are seen the two flaps of the mitral valve, which shuts off the return current of the blood as it is being driven by the strong left ventricle into the aorta, and at Ao are depicted the three flaps of the aortic valve, which is closed by the return current of the blood from the great aorta after it is pumped into that large blood-vessel by the ventricular contraction. It is plain to be seen that if the edges of these valves are rough or ragged or perforated, they cannot shut tightly and will allow some leakage to occur.

Symptoms.—When the disease is combined with hypertrophy or dilatation, as is commonly the case, the symptoms are more severe than those of hypertrophy or of dilatation alone, the paroxysms of palpitation and dyspnœa in particular being more violent, more obstinate and more easily excited. The action of the heart is irregular. The pulse is small, weak, intermittent, irregular and unequal.

Treatment.—Since we can neither replace or repair the damaged valves of the heart, the principles of treatment for chronic valvular disease are, in general terms, such as diminish the force and activity of the circulation, occasional venesection to a moderate extent, an unstimulating and rather spare, though sufficiently nutritious diet, a tranquil life, with respect both to the body and the mind, and a good state of the digestive organs and alimentary canal.

When there is dropsy diuretics are of the greatest utility. They are remarkably beneficial in an anterior stage of the disease; for, by drawing off the serous portion of the blood, they diminish the quantity without

deteriorating the quality of the fluid, and thus relieve palpitation and dyspnœa and obviate infiltration, without materially reducing the patient.

When diuretics do not remove dropsy and purgatives have failed, the practitioner is compelled to resort to puncturing. We say compelled, because the remedy is a last and dangerous resource. The danger, however, may be considerably diminished by making small punctures with a grooved needle, and allowing the fluid to ooze slowly during four or five days or a week. When incisions are made with a scalpel or lance, the fluid is evacuated quickly, as in twelve or forty hours, and the patient, according to our observation, generally dies.

FAINTING OR SYNCOPE.

Complete and, commonly, sudden loss of sensation and motion with considerable diminution or entire suspension of the pulsations of the heart and respiratory movements.

Symptoms.—It is to be distinguished from an epileptic or apoplectic fit by the fuller and apparent failure of the pulse and respiration, as well as by the previous history, if that can be obtained from friends or by-standers.

Treatment.—Syncope is, commonly, an affection of no consequence, but sometimes it is an index of diseased heart. Generally recovery from a swoon is rapid if the patient is laid flat upon the ground, without any pillow, the clothing loosened from the neck and a little cold water sprinkled in the face and the application of volatile substances to the nostrils are all that will be required during the fit. If recovery is delayed a turpentine injection or one containing a little whiskey and water should be administered, and the electro-magnetic current may be transmitted through the walls of the chest to stimulate the failing powers of the lungs and heart.

PALPITATION.

Symptoms.—All excessive or consciously disturbed action of the heart is commonly thus designated. Over-action in particular may have either one of the following origins: Nervous or hysterical, dyspeptic, rheumatic or gouty, hypertrophic.

All of the above forms of merely functional disturbance of the heart, and especially the purely nervous, may be known from hypertrophic over-action, or the conscious impulse of dilatation of the heart, by the fact

that they are not increased by moderate exercise; are often, indeed, much diminished thereby.

Treatment.—The treatment must vary according to its cause. If nervous, invigoration of the system and enrichment of the blood are most probably required, by iron and other tonics and regimen. Dyspepsia will require appropriate treatment; as a part of which exercise in the open air will not be counter-indicated at all by sympathetic palpitation.

ANGINA PECTORIS OR HEART PANG.

Symptoms.—It is a disease of an intermitting character in which the patient has intervals of comparative ease or perfect health between paroxysms of greater or less suffering. It is characterized by sudden attacks of severe pain, extending from the heart along the left arm, with a sense of stricture in the chest, prostration and alarm. The pain is rarely confined to its primary and principal site in the cardiac region, but increases, in different instances, very variously both in direction and extent. It shoots upward or downward or to the right side and almost always through the left side of the chest toward the shoulder and axilla and very frequently into the left arm.

Treatment.—The violence of the patient's sufferings and the belief in the nervous or spasmodic nature of the pain, suggested by its sudden invasion, would naturally lead the medical attendant, in the first place, to attempt to afford relief by anodynes; such attempts, however, have generally been attended with less success than might have been expected. In angina, as in toothache or tic douleureux, gastralgia, colic, or other violent pains, nature seems as if she scorned to be controlled by art, although so much under the influence of similar applications when less needed, as in the case of milder pains. Antispasmodics, cordials, carminatives, and so forth, have been much recommended and employed; and, upon the whole, with better success than anodynes. The inhalation of one or two drops of nitrate of amyl sometimes relaxes the spasm and affords prompt relief. Small doses of nitro-glycerine and hypodermic injections of from one-eighth to one-half grain of morphia also partly relieve the pain after a little longer delay. But although these or other means may afford relief, or may even ward off death, it is evident that every kind of treatment confined to the paroxysm is of very slight importance. Compared with that which is to be employed in the interval, the former can, at most, afford temporary relief; the latter may cure the disease.

HEART ASTHMA.

Symptoms.—Asthma from disease of the heart often imitates the characters of the other varieties, and this perhaps for a very simple reason; that the lungs are in much the same state as in those varieties. Thus the asthma is humid or humeral when there is permanent engorgement of the lungs, causing copious sero-mucous effusion into the air passages, as in cases of contraction of the mitral valve. It is dry when the engorgement is only transitory, as in cases of pure hypertrophy. It is continued when there is a permanent obstruction to the circulation, and may be convulsive when the heart has sufficient power to palpitate violently.

Treatment.—Numberless remedies have been tried; among them stramonium, nitrate of amyl, chloroform inhalations, and so forth. Arsenic enjoys full favor and deservedly holds an important rank as a therapeutic agent.

DISEASES OF THE ARTERIES.

The larger blood-vessels, both arteries and veins, are liable, like the heart itself, to various structural changes in disease, which, of course, lead to more or less serious disturbances in the circulation of the blood.

Symptoms.—Arteritis or inflammation of the substance of a blood-vessel, commonly commencing with the inner coat of the artery and extending through the whole structure of the wall of the tube, is a rare affection and scarcely ever detected before death.

Fatty and calcareous degenerations of the arteries are much more common, and consist in the deposit of fatty or chalky material in the arterial walls, generally in patches varying in size from a mere speck to an inch or more in diameter. This condition is commonly spoken of as a hardening of the arteries.

Treatment.—These diseases do not occur until after middle life, and no satisfactory treatment has been found.

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CURATIVE MEDICINE

PART VI

DISEASES OF THE RESPIRATORY SYSTEM

ASTHMA.

Causes.—An exciting cause may be an impurity of the blood. More commonly it arises from indigestion, bronchitis or valvular disease of the heart. Hay asthma is caused by the inhalation of particles such as arise from dried hay. The pollen from flowers and also from dogs, cats and other animals frequently give rise to it.

Symptoms.—This disease comes on in paroxysms. The paroxysm may be preceded for a variable time by a sense of oppression and constriction about the chest, with wheezing respiration. In many instances, however, it develops without any warning and most commonly at night. The patient awakes suddenly, scarcely able to breathe, and is forced to assume the sitting posture, or even to stand erect, with the shoulders raised and fixed, the head thrown back, the mouth open and all the extraordinary muscles of respiration brought into play to assist those powers of the system which are usually sufficient for the purpose. The face, in severe cases, wears an aspect of terror, the eyes are widely opened, the skin is pale and dusky and often bedewed with sweat. The feet and hands are cold and the pulse small and quick. The breathing, however, is not hurried, but inspiration is short and jerky and expiration inordinately prolonged. On percussion, the resonance of the chest is found to be increased and auscultation shows the vesicular breath-sounds are weak or suppressed and attended with whistling or cooing noises called râles. Toward the end of an attack, which may last for several weeks, cough comes on with the expectoration of small, firm, solid pellets of mucus, in rare cases mixed with blood. The duration varies greatly, the paroxysm passing off in a few minutes or lasting for many days. When it continues long, or is left

to itself, it is apt to subside gradually; but if brief or cut short by treatment, it often ends abruptly.

Diagnosis.—The diagnosis rests upon the paroxysmal and usually sudden nature of the onset, the absence of moist râles as determined by auscultation, and the complete recovery of patients in the intervals of their attacks. The cooing and whistling sounds heard all over the chest show the absence of any serious obstruction in the larynx and trachea, and the muscular effort being made for the purpose of inflating the lungs chiefly in asthma, from heart disease, instead of also in expiration as in the spasmodic form, which we are now considering, is another indication of value.

Treatment.—1. Among the most certain treatments are the inhalation of chloroform or ether and the hypodermic injection of an eighth or a quarter of a grain of morphia, either of which, in a majority of instances, may be depended on to relax the spasm and afford prompt relief.

2. Some of the most reliable internal remedies are chloral in fifteen-grain doses, which should be employed with great caution, or not at all if the heart is organically affected; ten or fifteen drops of tincture of lobelia or of ipecacuanha, as a nauseant or emetic, belladonna, valerian and strong black coffee.

3. The inhalation of the vapor of stramonium leaves, produced either by burning them on a red-hot shovel or smoking them in a pipe, and of the smoke of soft bibulous paper which has been soaked in strong saltpetre water and then dried, often affords relief, and, perhaps, as often fails in its desired object.

4. The treatment during the interval between the paroxysms must be directed toward building up the general health and fortifying the nervous system against the exciting causes of the disease. In some instances the action of small doses of lobelia is highly beneficial, and in others, patients who have been for years great sufferers from asthma enjoy a complete immunity from the malady as long as they keep themselves under the influence of iodide of potassium by taking from five to ten grains of it three times daily.

5. If medicinal treatment for the prevention of asthma proves unsuccessful, a change of climate and particularly a sea voyage should be undertaken, and it is claimed by some physicians in Colorado that the air of that region is almost a specific against asthmatic complaints.

HAY FEVER.

Symptoms.—Hay asthma or rose cold, commonly called hay fever, is a very prevalent form of asthma which comes on with symptoms of ordinary but severe cold in the head, constant sneezing, great discharge from the nose and in many cases intense difficulty of breathing. Many sufferers from this curious malady are perfectly well until a certain day in one of the months of June, July or August of every year, when they wake up in the morning, perhaps, with the symptoms above described.

Causes.—As already remarked, this form seems to be due to the inhalation of pollen from certain grasses or flowers, but when once commenced it may continue for several days, or even weeks, after its supposed cause has been removed.

Treatment.—The inhalation of sulphate of quinine in powder has been highly recommended in this affection, but the air (and other attractions) of various watering places seems to be the most popular and satisfactory remedy. The White Mountains or certain seaside resorts are looked upon by some patients as absolutely necessary for their health and comfort during an attack of this complaint. Adrenalin used in an atomizer three to six times a day will afford great relief.

Various Forms of Asthma.—Under the title of industrial asthma have been grouped several kinds of pulmonary disease, incident to different trades and occupations. These include saw-grinder's asthma, miner's asthma, potter's asthma and miller's asthma, caused by the mechanical irritation of minute particles of dust in the respired air.

NOSE CATARRH.

Symptoms.—This disease, so well known to every one as a common "cold in the head," is often epidemic, and is characterized at first by chilliness with sneezing and later by an abundant discharge of fluid from the nose. When severe it is attended with slight fever, pain and sense of weight in the head, pain in the limbs, prostration of strength, irritability of temper and inactivity of mind.

Causes.—Its origin can generally be traced to some imprudent violation of the laws of hygiene, such as exposure to draughts, insufficient clothing, sudden cooling when heated, and so forth.

Treatment.—The number and diversity of the infallible remedies for a common cold is sufficient evidence of their generally unsatisfactory

nature, but as the natural duration of the disase is from three to five days, the third or fourth medicine which receives twenty-four hours' trial often gains the credit of accomplishing a cure. If, as is usually the case, the bowels are constipated, a saline purgative, such as a Seidlitz powder or a bottle of citrate of magnesia, will usually relieve the headache, and then light diet, abstinence from fluids for a day and ten grains of Dover's powder at bed-time often seem to hasten the departure of this unwelcome guest.

LARYNGITIS OR INFLAMMATION OF THE LARYNX.

Three Forms.—This disease, which is one of the accompaniments of a common cold whenever hoarseness of the voice comes on, presents itself under three forms: First, the acute or edematous; second, the subacute or catarrhal, and third, chronic laryngitis. The first of these varieties may, if not properly treated, prove quickly fatal, by closing up the avenue of entrance for the air to the lungs and thus causing death by suffocation.

Symptoms of Acute Form.—Acute or dropsical laryngitis may commence as a slight catarrh, quickly followed by high fever. Speech, cough and respiration are all soon modified. The voice at first metallic, soon becomes whispering. The cough primarily clear and shrill, then harsh and croupy, is also reduced to little more than a whisper, and a peculiar noise like a loud whisper accompanies both inspiration and expiration, which are, from the beginning almost, laborious and wheezing. As soon as the dropsical swelling comes on and still further narrows the opening of the glottis, the effort to breathe becomes exceedingly painful and difficult and the patient's countenance expresses great anxiety.

Treatment.—1. Since acute laryngitis in the adult may destroy life in a few days, or even hours, it should be treated actively from the first onset by bleeding, if the patient is robust, or by leeching, active purgation with five- or ten-grain doses of calomel and jalap and calomel in grain doses every two hours to the extent of producing slight salivation as rapidly as possible.

2. If the inflammatory swelling proceeds or if dropsy comes on and interferes with the respiration sufficiently to cause lividity or blueness of the lips, the operation of opening the windpipe should be at once performed. It is better to open the trachea or windpipe sooner than is absolutely necessary, than to postpone the operation until the blood has been rendered very impure by want of a proper supply of oxygen; yet even up

to the last gasp and for, perhaps, a minute afterward, life may be saved by the surgical operation.

3. For children the danger to life from this malady is comparatively slight, so that bleeding and calomel may generally be dispensed with, and emetics, such as syrup of ipecacuanha or Coxe's hive syrup, in ten-drop doses every three hours for a child of three years old, with the inhalation of warm opiate vapors, as, for example, that from the spout of a tea-pot, in which has been placed with a small quantity of boiling water fifteen or twenty drops of laudanum, are generally sufficient.

Image of Vocal Apparatus as Seen in the Laryngoscopic Mirror Held Far Back in the Mouth.

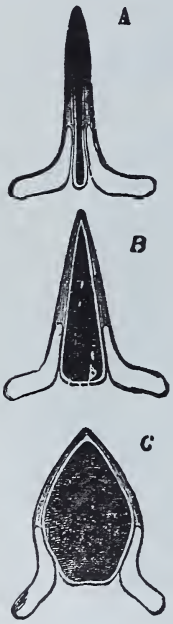
Subacute Form.—The subacute form of laryngitis rarely passes into the acute variety, and is, therefore, of but little importance. If severe, the same treatment by expectorants, nauseants and anodynes, recommended in acute laryngitis of children may be employed. Complete rest of the voice should be enjoined and inhalations of the various anodyne and astringent sprays are of great service in chronic cases.

Chronic Laryngitis Symptoms.—Chronic laryngitis is accompanied with actual thickening of the vocal cords, which, if the deposit be not subsequently absorbed, produces a permanent change in the voice. The respiration is usually but little affected, yet there may be a little tickling cough, an expectoration of small fragments of mucus and an almost constant desire to clear the throat.

Treatment.—Rest, by the avoidance of speaking above a whisper, a warm, moist atmosphere and medicated inhalations, are the important elements of treatment in this affection in its simple form.

The Laryngoscope.—By means of a small, metallic looking-glass, called a laryngoscope, a view of the epiglottis, the glottis itself, and, in favorable instances, the interior of the larynx, with some of the upper rings of the trachea, may be obtained. Such a view is given in the accompanying illustration.

Treatment of Throat Ulcers.—When, by means of the laryngoscope, the existence and seat of an ulcer can be established, it should be touched with a strong solution of nitrate of silver, in the hope of thereby promoting a tendency to heal; or inhalations of astringent solutions, such as that of the sulphate of zinc, or of copper, and of carbolic acid may be employed.



Changes of Position of the Vocal Cords.

TRUE CROUP OR PSEUDO-MEMBRANOUS CROUP.

For a full description of the causes and treatment of this disease see DISEASES OF CHILDREN.

DISEASES OF THE VOCAL CORDS.

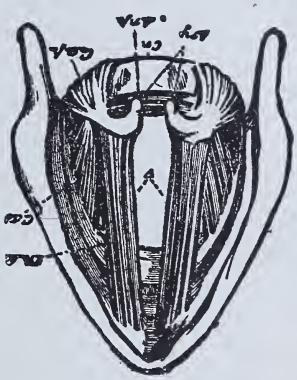
Tumors in Vocal Cords.—The development of new growth or little tumors within the cavity of the larynx is a cause of local obstruction to the breathing, which is happily rare. The three different kinds which have been met with are, first, the warty growths, having a firm structure, and attached to the inner surface of the laryngeal cavity by a broad base; second, polypoid growths, similar to those already mentioned as occurring in the nose, of a soft and jelly-like consistence attached to the mucous membrane by a pedicle or stem; and, third, cysts or hollow bags, containing, in some instances, parasites.

Paralysis of Vocal Cords.—Paralysis of the vocal cords, resulting in aphonia or loss of the voice, is a very grave misfortune under certain circumstances, as, for example, to clergymen or lawyers.

Changes in Vocal Cords.—The changes in position which these vocal cords undergo in the different processes in which they are concerned, will

probably be understood by reference to the accompanying diagram. At *A* is shown the appearance of the chink of the glottis, formed by the edges of the vocal cords, as it appears when examined by the laryngoscope whilst the patient is engaged in singing. *B* exhibits the condition in which it usually appears during easy and quiet respiration; and at *C* is represented the arrangement during forced inspiration or drawing a long breath.

Muscular Arrangement of Larynx.—The figure in the margin illustrates the arrangement of the muscles of the larynx, as seen after the membrane and elastic tissue constituting the vocal cords has been removed. *Th* represents the large and firm thyroid cartilage; *Ary* the upper ends of the arytenoid cartilages, to which the posterior ends of the vocal cords are attached; *V* indicates the position of the vocal cords. At *Arp* is represented the band of muscle called the posterior arytenoid muscle, which has the duty of pulling the arytenoid cartilages together, and so narrowing the slit of the glottis between the vocal cords as to cause the production of just the right sound for any particular note in singing. The mechanism of hoarseness in the voice or cough is simply as may be understood with ease from this diagram, that the edges of the vocal cords becoming thickened by congestion or slight inflammatory action can no longer vibrate quickly enough to produce the higher notes of the voice.



Muscles of the Larynx.

Loss of Voice.—In paralysis of the muscles of the glottis, which, small as they are, the explanation given a few pages back shows to be very important, not only is the power to produce audible voice sounds lost, but breathing is rendered difficult, and great distress is produced by the inability to take a long breath. Aphonia, or loss of voice, is of two kinds, the simulated and the true. An imitation of the real disease is generally hysterical in its character, and though it may last for a long time, is never really permanent; it may sometimes be recognized by the aid of the laryngoscope.

Treatment.—True aphonia is due to actual palsy of these little laryngeal muscles, is generally dependent upon some serious injury or disease, and therefore in most instances incurable. The treatment of the pre-

tended aphonia is that of hysteria. In bad cases chloroform may be given with advantage. During the intervals between the attacks, the bitter tonics, cod-liver oil and iron, and treatment for any uterine derangement, as described in the chapter on Diseases Peculiar to Women, should such disorder exist, are strongly indicated and will generally accomplish a cure in the course of time.

COMMON COUGH OR BRONCHIAL CATARRH.

Character.—This every-day disease is a subacute inflammation affecting the larynx, trachea, and larger bronchial tubes, sometimes commencing with nasal catarrh and traveling down, as it were, to the pulmonary organs. At other times, or in other patients, it appears to originate in the larynx, and does not affect the nasal passages at any time during its course.

Predisposing Causes.—The predisposing causes to this common affection are enumerated as being the loose, flabby texture of tissue in certain individuals, especially those who are the subjects of the scrofulous diathesis, and rickety children; second, a previous attack, and third, effeminate modes of life.

Direct Causes.—The directly exciting causes are:

1. Chilling of a portion of the skin, and especially the change of temperature of a portion of the body produced by sitting in a draught of air whilst perspiring freely, or with damp clothing or wet shoes.

2. Irritants acting directly on the mucous membrane lining the air-passages, such as dust, acrid vapors, or hot and cold air, and the grinders, millers and stone-cutters.

3. Obstruction to the current of the blood through the great branches of the aorta below the origin of the bronchial arteries, such as may be caused by abdominal dropsy, accumulation of gas, or of refuse matter in the intestines.

4. As a result of morbid states of the blood, as seen when bronchial catarrh is a premonitory symptom of typhoid fever, measles and small-pox.

Symptoms.—The general symptoms of a common cold on the breast are so well known to every one that it is not worth while to occupy space in describing them, and yet, frequent as is popular acquaintance with this disease, few persons realize the terrible dangers which attend upon a neglected cough.

Treatment.—1. The most important thing in relation to this malady

is to prevent its occurrence. This could probably be accomplished in four cases out of five by the exercise of a troublesome amount of prudence, which, however, would be well expended were young people willing to make the effort to escape this frequent cause of early death. When, however, a person is unfortunate enough to contract a cough by his own imprudence or otherwise, it may often be cut short by bringing on a free perspiration. A good way to accomplish this is to take a hot mustard foot-bath and ten grains of Dover's powder on retiring for the night, wrapping the throat up in flannel if it feels sore, and being very careful not to undo, and more than undo, the beneficial work of this treatment by uncovering oneself in the night, or by imprudent exposure the next day.

2. If this method is not resorted to early enough, or if it fails and the cough goes on unchecked, ten-drop doses four times a day of antimonial, or ipecacuanha wine, and nitrate of potash, or muriate of ammonia in quantities of five grains every three or four hours, are generally useful.

3. By the third or fourth day great advantage may be derived from the use of a mixture of half a teaspoonful each of syrup of squills and syrup of wild cherry with one-twelfth grain of cyanide of potassium every six hours. If this remedy agrees with the patient it may be taken more frequently or in sufficient doses to quiet the cough through the night, but it must be used with great caution, as it contains ingredients which are poisonous in over-doses, or ammonia chloride, $1\frac{1}{2}$ drachms; Brown's mixture, 4 ounces. One to two teaspoonfuls every three hours.

4. Should the disease persist notwithstanding the employment of these various medicines, counter-irritation with croton oil and tincture of iodine applied to small spots on the upper part of the chest in front, or croton oil alone rubbed on the back, also with great caution, should be resorted to without that further delay during which the catarrhal irritation of the bronchial tubes might become chronic, as it is commonly phrased, and the cough get such a hold that it cannot be shaken off.

Auxiliary Treatment.—A very important part of the treatment is the breathing of a continuously warm, moist atmosphere, and for children especially, the prescription of one warm room is probably more conducive to recovery than any one of the medicines suggested. Particularly ought young children, in whom previous experience has shown there exists any tendency to croup, to be guarded against the development of that dangerous affection by even the slight additional exposure of passing through

a cool entry to their meals. At the same time the apartment to which the invalid is confined must not be kept too warm, and due attention should be paid to its proper ventilation.

BRONCHITIS.

Character.—This disease, an inflammation of the bronchial tubes, or air-passages leading to the pulmonary vesicles, is characterized by hoarseness and moderate cough, with heat and soreness of the chest in front, all these being more or less intense according to the severity of the attack. In every common cough there is always some bronchitis, but the element of danger lies in the extension of the inflammatory action to the smaller bronchial tubes or bronchioles, and the approximation consequently to that fatal form of the malady termed capillary bronchitis.

Simple Bronchitis Symptoms.—Simple bronchitis is usually ushered in with a slight chilliness, general discomfort, and some febrile disturbance. A sense of constriction about the chest and some deep-seated soreness beneath the breast bone soon follow. The respiration is slightly increased in frequency, but no urgent dyspnœa is generally present, unless the patient is a sufferer from some chronic affection of the heart or lungs, as, for example, valvular disease of the former organ. Cough is uniformly present in bronchitis, is worse after sleep, and, as a rule, paroxysmal. The expectoration is at first scanty and viscid, but soon becomes more abundant, white and frothy, and still later yellowish or muco-purulent. In this latter stage the cough is looser, less painful, and the phlegm is expectorated more easily.

Capillary Bronchitis Symptoms.—Capillary bronchitis usually develops out of the simple form, and therefore its onset can hardly be said to be characterized by any well-marked symptoms. Occasionally, however, a sharp chill defines the date of its attack. When developed, the patient breathes with difficulty, the complexion is dusky, and the countenance betrays anxiety. The superficial veins are over-filled, as a consequence of the obstruction to the pulmonic circulation, and the movements of the sides of the nostrils are exaggerated. The respiration and pulse are quickened, the former very much so, and out of proportion to the latter. The cough is almost constant, and the expectoration, at first frothy, and after a time yellowish, is expelled with considerable difficulty. Troublesome pains in the intercostal muscles, brought on by the unremitting exertion of coughing, are of frequent occurrence, the temperature rises to a consider-

able elevation, and the restlessness is extreme; the renal excretion is scanty, and sometimes a little albuminous. In fatal cases the prostration becomes intense, the skin livid, cold and clammy. Dropsy of the feet and legs may come on, and at last fitful drowsiness or muttering delirium precede coma and death.

Acute Bronchitis Diagnosis.—The diagnosis of acute bronchitis is ordinarily not difficult. Capillary bronchitis must be distinguished from pneumonia, which can generally be done by the greater amount of fever and disturbance of the respiration as well as the dullness on percussion, tubular breathing, and irregular distribution over the chest of the latter affection. In acute tuberculosis, or galloping consumption, the violence and irregularity of the fever, the rapid collapse of strength, and the extreme dyspnœa, out of all proportion to the physical signs, indicate the nature of the case in most instances.

Treatment.—1. A threatened attack of bronchitis may sometimes apparently be cut short by a hot foot-bath and dose of Dover's powder, as already suggested, and a full dose of ten grains of salicin or of quinine will perhaps aid the good work of this treatment.

2. After the disease is fully developed the remedies are chiefly palliative, and consist of opiates, such as morphia, belladonna, or preferably, in many cases codeia, in half-grain doses, to quiet the cough and promote the expectoration. The softening of the secretion, and easing of the incessant cough, are also promoted by keeping the patient in a moist atmosphere, as suggested in regard to croup.

3. Pain in the chest can often be relieved by mustard-plasters and stimulating liniments, or painting with tincture of iodine. Half teaspoonful doses of the syrups of squills, ipecacuanha and lobelia, every two, three or four hours, according to the urgency of the symptoms, are probably useful, and the iodide of potassium, in five-grain doses, if well borne by the patient without irritating the mucous membranes of the eyes and throat, as it sometimes does in a singular way, is highly recommended.

Diet.—There is no need of restricting the diet in this disease, and any wholesome food which the patient craves may be allowed. In the treatment of the capillary bronchitis of young children it is necessary to use opiates with much greater caution, and the occasional administration of an emetic, to aid in clearing out the accumulated mucus, is important. Counter-irritation by mustard or turpentine may be tried, and dry cupping often gives great relief.

Chronic Bronchitis.—Chronic bronchitis is a very common malady,

its frequency increasing with the coming on of old age. It may be chronic from the outset, or be the result of the acute form. Chronic lung diseases generally are apt to lead to it, and so does the abuse of alcohol.

Treatment.—Chronic bronchitis, especially when in the form called dry catarrh, is often relieved by iodide of potassium and colchicum.

PNEUMONIA OR INFLAMMATION OF THE LUNGS.

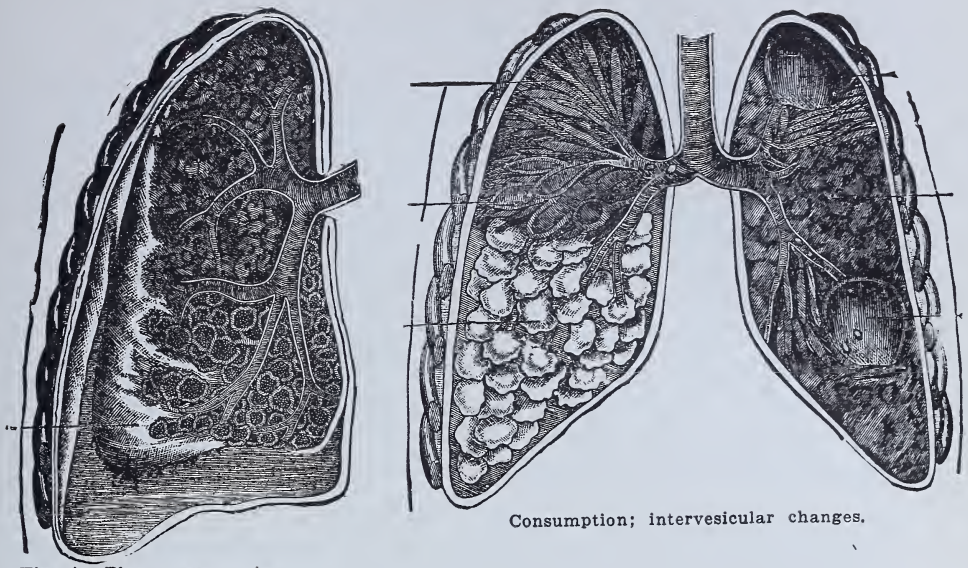
Causes.—This disease, called also lung fever, is the most serious of the common acute diseases of the pulmonary organs. Long continued exposure to cold is apt to be the exciting cause of pneumonia; but there are some reasons for supposing that it is, at least in many instances, a local manifestation of a general disease, perhaps contagious in its character. It often comes on in the course of other grave maladies and adds very much to their fatality.

The Stages.—The three stages through which this complaint passes in typical cases, are, first, that of congestion, where the lung is engorged with blood; second, that of red-hepatization, in which the inflamed lung is dark red and solid like a piece of liver, sinking in water and breaking down readily under the pressure of the finger; and, third, the stage of grey-hepatization, in which the affected pulmonary tissue is still dense, but of a yellowish-grey color.

Symptoms.—1. The symptoms of an ordinary attack of pneumonia, coming on from exposure to cold, in a robust adult, are quite characteristic. The disease usually sets in with a single severe and prolonged chill, after which the temperature of the body rapidly rises to a high point and this rise is accompanied by the customary symptoms of fever. Pain is commonly felt about the region of the nipple on the affected side and is sharp, stabbing and aggravated by movement in breathing or otherwise, and also by pressure.

2. There is, likewise, well-marked dyspnœa, characterized by extremely frequent, shallow breathing, quite different from the kind of dyspnœa observed in bronchitis and in asthma; the rapidity of respiration ranges from twice to four times the frequency of health; that is, from about thirty to sixty per minute; and this increase in the number of the respiratory efforts is partly due to fever, partly to impurity of the blood and partly to the pain which prevents drawing a full breath. The sides of the nostrils are commonly in active movement at every inspiration.

3. The third prominent symptom is cough, generally frequent, hack-



Consumption; intervesicular changes.

Fig. 1.—Pleuro-pneumonia.

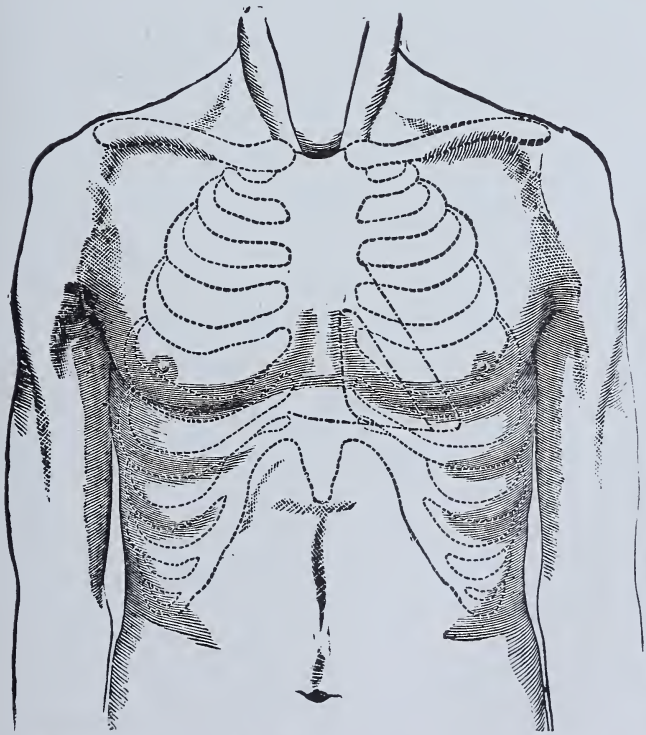


Fig. 3.—Surface of the breast in a normal condition; contours of cardial torpor to the left of the breast bone. The spaces included in the dotted lines represent the intermediate spaces.

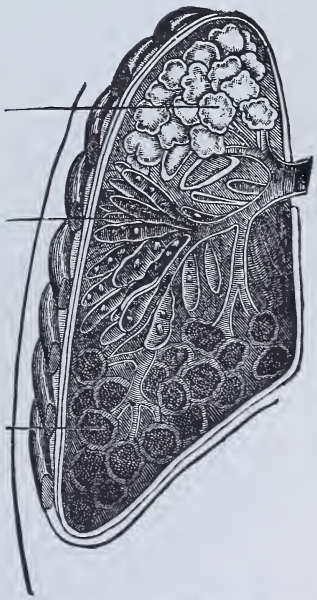


Fig. 4.—Croupous or vesicular pneumonia. Estate of consolidation.

ing and constrained on account of the suffering which it causes. It is dry at first, but on the second or third day the patient commences to bring up at each paroxysm of cough, some of the peculiar, viscid material of exactly the color of rusty iron. This expectoration does not occur in young children, is often absent in secondary pneumonia and in the pneumonia of the aged. The fever usually attains its height on the second or third day.

4. The pulse is usually strong and full at the outset, but later on in the attack it becomes small and weak, partly as a result of the imperfect filling of the arteries from obstruction of the pulmonary circulation and partly from cardiac feebleness. The cheeks are flushed to a very marked degree and an eruption of little blisters, a variety of herpes, is sometimes present upon the lips, which are of a dusky hue. Prostration, feebleness, headache, restlessness and delirium at night are common. The tongue is dry and coated, the thirst is eager, but the appetite for food is lost and the bowels are costive.

5. In favorable cases, these symptoms which have been detailed gradually increase up to the fifth, sixth, or seventh day and may then rapidly subside, the temperature falling to the natural standard two or three days later, and the solidified portions of the lung clearing out occasionally with wonderful celerity. The cough and dyspnœa speedily abate, and the sputum becomes yellow and muco-purulent. When the malady ends fatally, death usually occurs about the end of the first or early in the second week, and results from failure of the action of the heart, or else from pulmonary embarrassment.

Treatment.—1. There is no doubt that the intense pain accompanying the onset of pneumonia can be promptly relieved by blood-letting; but since the tendency of the disease is toward death by debility and it is impossible to say in any given case how far over the pulmonary structure the inflammation will extend, we can never feel sure that the loss of the vital fluid abstracted will be safely borne by the patient. In very robust persons, in the prime of life, it is proper to bleed; because the chance of diminishing the violence of the attack thereby is at least equal to the danger of seriously decreasing the strength. In less vigorous individuals, leeching or cut-cupping, and in patients of feeble constitutions, dry-cupping will generally afford considerable relief.

2. Large doses of quinine, even as much as twenty or twenty-five grains, may be given at the first onset, in the hope of cutting short the disease and later on for the purpose of reducing the fever, which in itself

is a great cause of danger, as already explained. Opiates in the form of Dover's powder, the hypodermic injection of morphia, or of codeia in half-grain doses, when the latter medicine suits the patient, are of great service in diminishing suffering, procuring sleep and allaying cough.

3. Toward the latter part of a severe attack the chief treatment is that of nutrition and stimulation, and as there is often in this disease a great tolerance by the nervous system of alcohol, such as we see in typhoid fever, immense amounts of milk-punch, or diluted brandy and whiskey, are sometimes consumed with apparent benefit. Alcoholic stimulants should never be given to the extent of producing symptoms of intoxication, but short of this point they are of great service in keeping up the action of the heart and thus preventing the fatal effect of cardiac failure.

4. Since the immediate cause of death in many examples of fatal pneumonia is the over-distension of the right side of the heart, with consequent separation of fibrin in the partially stagnating blood constituting heart-clot, it is advisable to diminish this tendency to coagulation of the blood in the heart and the production of a thrombus by the administration of five grains of carbonate of ammonia every three or four hours, which, however, ought not to be continued for more than a day or two.

Diet.—During convalescence from inflammation of the lungs danger from relapse is not nearly so great as in many other maladies, such, for example, as diphtheria, and hence free indulgence of the appetite for all wholesome food and out-door exercise, as soon as the strength permits, may be allowed.

EMPHYSEMA (LUNG DISTENSION).

Varieties.—The two varieties of emphysema are, first, the vesicular, in which the vesicles are distended and dilated, and the interlobular, in which the air has escaped from the air-cells in consequence of their rupture, and diffused itself through the connective tissue of the pulmonary substance. This condition is commonly the result of accidents leading to great straining in the respiratory muscles, as in the violent paroxysms of whooping-cough and of asthma, and men or animals who are the subjects of emphysema are popularly and very accurately described as "broken winded."

Symptoms.—The symptoms of emphysema are in direct proportion to the amount of lung-tissue affected, and consist of dyspnœa which resembles that of asthma and is unlike that of valvular disease of the heart in being especially marked during the effort at expiration. Cough is

usually present, but is not attended with expectoration, unless the disease is complicated with chronic bronchitis, as is frequently the case. In bad cases of emphysema the interference with the aeration of the blood is so great that the complexion is dusky and the patient languid and dull.

Treatment.—The treatment of this disease is limited to palliating the symptoms as much as possible, and remedying the maladies, such as chronic bronchitis or asthma, with which it is frequently complicated. Anodynes, which appear urgently called for to relieve the pain and distress must be employed with caution on account of the imperfect aeration of the blood, which is already an element of danger. Dry cupping between the shoulders is often of service, and the use of quinine, iron and strychnia, as directed in anemia, is beneficial by improving the general health. Change of residence to a warmer and more equitable climate than that of the northern United States is probably the best remedy we can urge upon patients afflicted with emphysema.

TUBERCULOSIS.

How We Get Tuberculosis.—We can get tuberculosis only by receiving into the body the little germs known as the tubercle bacilli. The consumptive infects another, or gives tuberculosis of the lungs to another, by means of the tubercle bacilli in the material coughed up from the diseased lungs, which often contains millions of these germs. The germs get out of the body of a person who has tuberculosis, not only in the material which is coughed up, but also in the little drops, too small to be seen, which are sprayed out when persons with tuberculosis cough or sneeze.

Great care should be taken to destroy all material coughed up by the consumptive, and to avoid careless coughing and sneezing. If this is not done, and the sputum is discharged on the floor or carpets or clothing, the germs may live for months, especially in dark, damp, unventilated bedrooms, living rooms, and workrooms.

The germs will live in the darkness and dampness for a long time, and are stirred up in dusting and sweeping these rooms, and float in the air and may be breathed into the lungs, or may fall upon articles of food and be taken into the body in that way.

The disease is often called CONSUMPTION, for the reason that during its progress the patient loses weight rapidly, and hence seems to be consumed. Tuberculosis may infect any other part of the body besides the lungs, such as the bones, joints, intestines, glands, brain, spinal cord,

and the skin, but of all forms of inflammation, that of the lungs is most common. *The tubercle bacillus is the only cause of the disease.* Twenty-five hundred of these germs placed end to end would not be one inch in length. These germs may gradually spread through the greater part of one or both lungs, destroying the usefulness of those organs until finally the patient dies of the disease.

Many people think that pulmonary tuberculosis comes from a cold or some other disease, or is inherited. This is not correct. The reason why people develop tuberculosis after a prolonged cold or pneumonia or other exhausting disease is because their systems have run down to such an extent that they are not strong enough to resist the tubercle bacilli when taken into their bodies. These germs are widely distributed, and practically all people breathe them in at times. If their systems are in excellent condition, the germs do not gain a foothold and start the disease. Any condition that weakens the body predisposes one to consumption.

Symptoms.—There are a number of symptoms which might lead a person to suspect that he has pulmonary tuberculosis, namely: loss of weight, loss of appetite, loss of color, fever in the afternoon, cough and expectoration lasting for several weeks, spitting of blood or streaks of blood in the sputum, chills, night sweats, difficulty in breathing, and pains in the chest.

In incipient tuberculosis the commonest symptoms are loss of weight with cough and expectoration. When these symptoms occur it does not necessarily mean that tuberculosis exists, but it would be wise for a person having them to consult a physician.

Medicines.—There is no medicine that will cure consumption. It is a waste of time and money to use so-called "Consumptive Cures." All advertised cures of this nature are frauds. Doctors who advertise should be avoided as much as medicines which are advertised. Reputable doctors do not advertise.

Treatment.—The treatment for tuberculosis is rest, with plenty of fresh air, and enough good wholesome food. No medicine is necessary except in cases where other diseases are present. The disease may be cured at home in many instances if it is recognized early, and proper means are taken for its treatment. When a number of a family is found to have consumption and cannot be sent to a sanatorium, arrangements for taking the cure at home should be made as soon as the disease is discovered.

It is important, in the treatment of tuberculosis, to breathe air that

is fresh and pure, to eat an abundance of good food, to stop heavy work and worry, and to take a bodily and mental rest by lying down before and after the noon and evening meals. To obtain the first, the patient must live out of doors. This means that as many hours of the day and night as possible should be spent in the open air, and in order to carry out this treatment some place must be provided which is not only protected from wind, but also from rain and snow, as nothing except the most severe cold weather should prevent the patient from living and sleeping there. The outdoor shelter should be large enough for a bed, a reclining chair, and a table. It should overlook pleasant and sanitary surroundings if possible, as it is to be the home of the patient for months, and will give better results if comfortable and attractive.

Tenement house dwellers and persons living in apartment houses in large cities should make every effort possible to give the open air treatment to a member of the family who contracts tuberculosis. First, consider the possibility of moving into the suburbs or nearby small towns. If this cannot be done, try to obtain from the landlord the use of the roof, and build a small shack there. If this is beyond the means of the family, use one room with a window opening on the street or large court for the patient, and then place the head of the bed beside the window and cover it with a window tent. The cost of a window tent is about $10, and if it cannot be obtained, take two large heavy cotton sheets, sew them together along the edge, tack one end of the double sheet to the top of the window casing and drop the lower end over the outer side of the bed, fastening the bottom of the sheet to the bedrail with tape. There will be enough cloth hanging on each side of the window to form the sides of the tent, and these should be fastened to the window casings. A window tent can be made at home for about $3 by using 12 or 15 yards of heavy denim or light canvas. One straight piece of denim should be hung from the top of the window casing to the outer side of the bed, and the openings between this and the side window casings filled in with sides cut and fitted from the balance of the cloth. By these methods the patient gets fresh air from the window and the room is kept warm in cold weather as a place for dressing and toilet purposes. During mild and warm weather the tent can be removed and the window kept open both at top and bottom.

How to Arrange a Porch.—If the family lives in a small town or in the country, it will usually be found that a porch is the most convenient way of providing open-air quarters. In selecting a site for the porch,

it is well to remember that the patient should be placed out of doors in such a way that the cure can be taken with comfort at all seasons of the year. For the winter months the best place is on the south side of the house, as there will be found the greatest amount of sunshine. If this cannot be done, choose first the east, or second the west side, but not the north side except as a last resort, for it is a windy and cold position in winter. The back of the house is usually better than at the front, if the porch cannot be seen from the street. *The most important thing is to find a sheltered spot, for wind is much harder to bear than intense cold.* If the house has permanent verandas, and you cannot afford a special porch, use a veranda, and obtain privacy by putting up canvas curtains or bamboo screens.

How to Build a Cheap Porch.—A useful porch can be built for $12 or $15 with cheap or second-hand lumber, and if only large enough to receive the bed and a chair will still be effective for the outdoor treatment. The roof can be made with a canvas curtain or a few boards and some tar paper. The end most exposed to the wind and rain and the sides below the railing should be tightly boarded to prevent draughts. A window can be used for the approach, but it will be more convenient if it is cut down to the floor and a small Dutch door put in below the window sash. Second and third story porches are supported from the ground by long 4 by 4 posts, or, when small, they can be held by braces set at an angle from the side of the house.

Bed and Bedding for Outdoor Sleeping.—An ordinary iron bedstead with woven wire spring 3 feet 6 inches wide and a moderately thick mattress are all that are necessary except for cold weather. A good hair mattress is best, but when this cannot be obtained, a cotton-felt mattress can be bought for $4, or a wool mattress for about $10. Over the mattress place an old blanket or a cotton bed-pad, the same width as the mattress, and on this the ordinary bed sheets or blanket-sheets. For those who like heavy bed covering as many blankets as desired may be used. Those who prefer light covering can use down comforts, or lamb's wool or cotton-filled comforts, or the material for wool or cotton quilts can be obtained for about $2 and warm covering made at home. Very cheap, light, but warm covering can be made by using paper blankets placed between two thicknesses of outing flannel or bed covers. These paper blankets are sold for fifty cents each and wear for about six months. A woolen horse blanket with an outside of canvas can be used as a covering to protect the bedding in wet and stormy weather.

Sleeping-Bags.—In very severe weather a sleeping bag may be used, and this is made by sewing blankets together around the edges, leaving the top open, using as many layers as desired. The blankets should be 7 feet long by 4 feet wide.

Arrangement of Pillows.—Place two pillows in form of an inverted V, with the apex at the top of the bed and the head at the point where the two pillows meet. This position allows the shoulders to nestle between the pillows and protects them from the cold wind.

How to Prepare the Patient for the Night.—In cold weather the outdoor sleeper should get into the bed in a warm room and have some one roll him out of doors. If this is impossible, use a warm dressing-gown in going back and forth from the dressing room to the porch, and warm the bed by placing in it for a few minutes before retiring a hot water bag, hot bricks, soapstones or bottles filled with hot water. In some cases it is well to leave a hot stone or bottle wrapped in flannel at one corner of the bed, where it will throw off heat slowly during the night.

All covers except the top blanket or comfort should be tucked in under the bed-pad. The topmost cover is then tucked under the mattress to keep the under covers from sliding off when the sleeper is restless.

Clothing Worn at Night.—A woolen undershirt, a sweater and a long outing flannel nightgown or bathrobe are usually worn, but in very cold weather some patients wear a pair of drawers made of flannel, a pair of bed-socks or knitted slippers, and a woolen abdominal bandage. *Never cover the head with the bedclothes.* The patient can wear a knitted skull-cap long enough to be pulled down to the end of the nose and over the ears, or a knitted helmet which covers the whole of the head, face and neck, with the exception of a small opening for the nose and mouth. Care should be taken not to interfere with the inhaling air or to allow the breath as it is expelled from the nose or mouth to come in contact with the cloth and form icicles. Chapping of the face during the night can be prevented by using cold cream or vaseline about the nose and lips.

General Directions.—Rest is a most important part of the open air treatment, and exercise must be regulated by the doctor. Always have at hand an extra wrap, and never remain out if chilled. Cold weather should have a bracing effect, and when it does not, go into a warm room and get a hot drink, preferably milk, remaining indoors until comfortably warm. When going out again use more wraps and keep behind a shield or screen that breaks the force of the wind. Always be cheerful and hopeful; never waste your strength in anger or being cross. Lead a temperate life, go to bed early and get up late; do not use alcohol in

any form except when prescribed by your doctor. Do away with tobacco if possible, and use only weak tea and coffee in small quantities. Never swallow the matter coughed up, but always destroy every particle by spitting in a paper or cloth which can be burned. Never allow the hands, face, or clothing to be soiled by sputum, and if this happens by accident, wash the place soiled with soap and hot water. Men who have consumption should not wear a mustache or beard unless it is trimmed close. Particular care must be taken, when sneezing and coughing, to hold in the hands before the face a cloth which can be burned. Soiled bed-clothes, night-dresses, other washable garments and personal linen should be handled as little as possible until they are boiled prior to their being washed. The dishes used by the patient must be boiled after each meal.

All this means care and work, but must be done both as a protection to the household and in order to bring about a speedy cure for the patient.

Deep or full breathing is especially recommended to those who have consumption or any weakness of the lungs. See article on deep breathing.

CONSUMPTION OR PULMONARY PHTHISIS.

Character.—Tubercular phthisis or true pulmonary consumption is that form in which the peculiar tubercular matter is deposited in the lungs in small masses or tubercles, varying in magnitude, but generally about the size of a mustard seed. Such tubercles become centres of irritation, inflammatory action and suppuration, or formation of abscess, and these processes end by destroying a smaller or larger spot of the lung-substance, and leave a cavity or vomica in the pulmonary structure.

Causes.—The disease is constitutional, and according to the researches of Dr. Koch, the celebrated Berlin microscopist, contagious, the whole malady being the result of development in the lung of a very minute bacterium, named by Dr. Koch the bacillus tuberculosis. In America it is usually developed between the time of puberty and the twenty-fifth year, and in nine cases out of ten seems to be primarily lighted up by a cold or some depression of the nervous system.

Early Indication.—Hemoptysis or spitting of blood, usually in small quantity and only serious as a symptom of very grave import, is often one of the earliest indications of pulmonary consumption.

Galloping Consumption.—Acute phthisis or galloping consumption is the most rapid form of this terrible disease, and has been known to prove fatal in the short space of six weeks. It usually commences with chills and fever of the hectic type. Cough, dyspnœa on very slight exertion and

out of all proportion to apparent amount of disease in the lungs, is almost a characteristic of the complaint. The expectoration soon becomes profuse, and is frequently tinged or streaked with blood. This blood is never mixed throughout the sputum so as to give it the color of rusty iron, which is so indicative of pneumonia. The pulse is frequent and feeble, the tongue red and furred, the appetite poor or absent entirely, and there is often a tendency to diarrhœa.

2. In the rapid progress of the disease there is, after a few weeks, great exhaustion, profuse sweating, speedy emaciation and restlessness, amounting in persons of nervous temperament to delirium. Acute phthisis coming on in this way is almost without exception fatal, but in rare cases there may be a decrease in the violence of the symptoms, and the patient enjoys a temporary improvement, only, however, to pass into the ordinary condition of chronic consumption.

Treatment.—The treatment of some of the very few cases which have ever been reported as cured was that of rest in bed, a liberal supply of fluid nutritious food and stimulants, frequent application of iced cloths to the chest to subdue the fever, these being at once removed if there was any tendency to faintness thereby produced, hypodermic injections of atropia to check the sweating, and pills or powders containing two grains of quinine, a half grain of digitalis, and opium in amounts of from a quarter to half a grain, four, five or six times daily.

CHRONIC PULMONARY CONSUMPTION.

Symptoms.—1. The onset of chronic pulmonary consumption is generally gradual, and marked by one or more of the symptoms of progressive debility and by loss of flesh, chronic dyspepsia, diarrhœa, alterations in the voice, and in females suppression of the monthly periods. In more than half the cases spitting of blood occurs, and a cold or cough is apparently the starting-point in very many instances. A dull, aching pain just below the collar-bones in front or the shoulder-blades behind is very often complained of, even whilst the amount of tubercular deposit is small, and is probably due to little spots of pleuritic inflammation. Muscular pains in various parts of the frame are often present. The short, dry, hacking cough of early phthisis is usually referred to some irritation about the larynx or trachea, but is, in reality, due to irritation of the bronchial mucous membrane.

2. Weakness of the voice and hoarseness are very common, and a

purplish mark upon the edges of the gums, where they come in contact with the teeth, is often observable, and is thought by some physicians to have considerable diagnostic value. In at least fifty per cent. of the patients spitting of blood appears early, and recurs at various intervals, giving the first positive evidence of the existence of consumption. Very rarely, however, is the expectoration of blood in the early stage of consumption directly dangerous to life.

3. Among the other symptoms loss of strength is one of the most constant. The patient soon finds that slight exertion, such as ascending a little hill, or even a short flight of stairs, causes fatigue, hurries the breathing and often gives rise to palpitation. The uterine functions in women are apt to be disturbed, and the liver becomes congested and tender. The tongue gets red and irritable, and little sores called apthæ form upon its sides and on the mucous membrane of the fauces.

4. Hectic fever coming on toward evening and giving a deceptive appearance of the flush of health to the emaciated countenance develops. There is a total loss of appetite with great thirst, and the loss of flesh is almost visible from day to day. The hair grows thin and loses it attachment to the scalp. The debility is extreme and exhaustive night sweats make their appearance. In females there is a total cessation of the menses, which is a most discouraging evidence of failure in vital power. An unmanageable diarrhœa often sets in and conspires with the other causes of debility to utterly prostrate the unfortunate invalid. The lower limbs become very painful, and dropsical swelling of the feet and ankles appears, constituting what is vulgarly called the bloating consumption.

5. Toward the close, cough and abundant expectoration become, if possible, even more troublesome. Great nervous restlessness, cramps in the legs, pain about the loins, distress in passing water, utter prostration and the ever present difficulty of getting the breath, tend to render the last few nights of existence most agonizing.

Diagnosis of Consumption.—It is so important that the diagnosis of consumption should be made at the earliest possible period, when the chance of life by change of climate is greatest. After the disease is fully developed, and the abundant expectoration, great loss of flesh and strength, night sweats, and associated sore throat from laryngeal tuberculosis manifest themselves, there is often no room for doubt that consumption has developed, even without the aid of auscultation and percussion; but in the incipient stage just grounds for suspicion are furnished by the presence of slight hacking cough which has resisted the usual remedies, a little

spitting of blood, provided the patient can be sure that it does not come from the gums or from the back part of the nose, and marked dyspeptic symptoms with loss of flesh and strength out of proportion to the length and apparent severity of the illness.

Treatment.—1. The treatment of consumption consists in the palliation of symptoms and the administration of tablespoonful doses, thrice daily, of cod-liver oil, the phosphates or hypophosphites of iron, lime, and the alkalies; the internal and external use of iodine, and last but not least, of persistent counter-irritation over the diseased spot in the lung, generally near its top and just below the collar-bone, with tartar emetic ointment. Nearly all the cases of recovery from well-defined phthisis, coming under the observation of the writer, have been apparently due in large measure to this system of treatment.

2. In the second stage of consumption—that is, after the deposit of tubercular matter has begun to soften and before any large cavities have formed—the prospect of cure by this or any treatment is diminished; but even from the third stage—that of the formation of large cavities and extensive destruction of lung-tissue—recoveries occasionally occur.

3. The palliative treatment of consumption further consists in relieving the cough and pain in the chest by expectorants and anodynes, improving the appetite and strength by tonics and stimulants, controlling the diarrhœa with astringents and correcting the derangements of digestion with antacids and other anti-dyspeptic remedies.

4. Most patients afflicted with phthisis will find themselves for a time benefited by, first, a cough mixture composed of acetate of morphia, cyanide of potassium, syrup of squills, and syrup of wild cherry or syrup of tolu, as already suggested, used chiefly at night to promote sleep in the nocturnal hours and allow the expectoration necessary to relieve the lungs from their accumulated load of sputum to be carried on in the daytime; or elix. of terpen. hydrate and codeine; second, by a pill of two grains of quinine, half a grain of digitalis, and one-fortieth of a grain of strychnia, with the addition of half a grain of iron, should the condition of anemia exist and there is no tendency to spitting of blood to forbid its employment; third, by a mixture of a teaspoonful of syrup of krameria, five grains of prepared chalk, twenty drops of compound spirit of lavender and ten of wine of opium, to check diarrhœa when that appears; and fourth, by powders containing five grains each of bismuth, soda, charcoal and pepsin, or ten of lacto-peptine, with wineglassful doses of the infu-

sions of gentian or columbo, as may be found best adapted to the particular case as stomachics.

5. For patients with whom morphia or opium disagrees, codeia, lactucarium, chloral, bromide of potassium, or hyoscyamus may perhaps be substituted, and in some instances morphia, where illy borne alone, becomes quite acceptable to the stomach when associated with one one-hundredth of a grain of atropia, or with twenty grains of bromide of potassium.

6. When obstinate diarrhœa torments the invalid, the metallic astringents, such as half a grain of sulphate of copper, or one-quarter of a grain of nitrate of silver, thrice daily, are frequently useful, or ten-grain doses of subnit. bismuth succeeds in controlling the intestinal disorder when all other remedies prove unavailing. The profuse and debilitating night sweats may often be checked by sponging with finely-powdered alum and whiskey, by full doses of quinine, or by hypodermic injections of the sulphate of atropia.

7. Seeing, however, that the prospect of curing consumption by medical treatment is so mournfully gloomy, it becomes doubly important to urge that every patient whose circumstances will admit should resort to a change of climate. And this migration ought to be made with scarcely a day's delay after some amply competent authority has determined by thorough examination the necessity of such a change in the colder seasons of the year.

THE HOFF PRESCRIPTION FOR CONSUMPTION.

Professor Hoff, of Vienna, claims most beneficial results from the following formula:

Arsenic Acid	1 part
Carbonate of Potash	2 parts
Cinnamyllic Acid	3 parts

Heat this until a perfect solution is obtained, then add twenty-five parts cognac and three parts watery extract of opium which has been dissolved in twenty-five parts of water and filtered.

Dose: At first take six drops after dinner and supper, gradually increasing to twenty-two drops.

As long as the patient shows signs of improvement the dose should not be increased. It is sometimes beneficial to reduce it.

Professor Hoff claims that the physiological action of this remedy is

peculiar, in that it does not arrest secretion in the respiratory or intestinal tract, while it has marked power to control inflammation and irritation. It stops all unnecessary and injurious coughs, relieves the soreness, quiets the irritation and brings rest. He claims that the results are usually highly satisfactory, that the cough diminishes more or less rapidly, dreamless sleep follows, the sputum becomes looser and the appetite increases. He claims that it supersedes cod-liver oil in more ways than one, not the least of which is that it is palatable, consequently it does not disorder digestion or produce nausea. By its use the cough is at once ameliorated, the perspiration is diminished, the patient is strengthened, thereby enabling him to expectorate the loosened mucus with greater ease, and frequently the consumptive steadily improves and regains health.

Professor Hoff claims that mild cases have been quickly cured and partial cures have been effected in severe cases, the appetite and weight increasing steadily and there being a steady lessening of fever, night sweats, insomnia and asthmatic symptoms. He points out that in using the treatment the patient must keep the kidneys in order. The duration of treatment depends upon the condition of the patient. Professor Hoff declares that mild cases are sometimes cured in a few months while those more severe may require a year or two. It is essential that the solution be taken after eating, when the stomach is full.

PLEURISY.

This disease is an inflammation of the pleura, or delicate membrane which surrounds each lung.

Causes.—Pleurisy presents itself under two forms—the acute and the chronic. Its common cause is exposure to cold, but sometimes it arises from injury, as, for example, from the pleura being wounded by the jagged end of a broken rib; or, secondarily, adjacent inflammation, such as takes place around a nodule or tubercular deposit in consumption, or in the course of some other disease, for instance, Bright's disease or scarlet fever.

Symptoms.—1. The onset of acute pleurisy may be insidious, but generally, when arising from its usual cause, exposure to a very severe cold, it is rather sudden and marked by repeated chills. As soon as the patient reacts from these, the temperature begins to rise and thus furnishes a distinguishing symptom which often enables the complaint to be discriminated from pneumonia.

2. At the same time, or very soon after the rise in temperature, pain, cough and dyspnœa are observed. The pain is almost always referred to the affected side, a few inches below the nipple, and is sharp and darting, described as resembling a stab with a keen knife, especially on trying to take a deep inspiration or to cough. As a rule, the difficulty of breathing is slight and mainly due to the pain in the side and to the febrile excitement in the system. The cough is short, hacking, and accompanied with little or no expectoration; the pulse is quickened; the tongue is somewhat furred, the appetite impaired, but the thirst is increased, and the bowels are confined.

3. After a variable period, averaging, perhaps, between one and two weeks, the attack usually terminates in recovery, with or without a contraction of the wall of the chest on the affected side, according as the lung is able to expand after being compressed by the effused fluid; or the malady may end in the chronic form of pleurisy, or very rarely in the uncomplicated affection it may have a fatal result.

4. In chronic pleurisy the effused liquid remains in the pleural sac, without becoming absorbed. It is especially apt to become purulent in a short period in children, or in persons whose health is impaired from any cause. When this degeneration takes place there is always more or less febrile disturbance of a hectic type set up in the system generally. The skin of the affected side after a while becomes, over the seat of the effusion, reddened, tender, swollen and dropsical. The finger nails are often clubbed, as in consumption, and night-sweats are not infrequent. Cough is apt to be troublesome and may be accompanied by an expectoration of muco-pus, which in rare cases possesses a putrid odor.

Diagnosis.—The diagnosis of pleurisy without the aid of auscultation and percussion, must often be difficult, at least for the first few days of the attack, but it can sometimes be made from pneumonia by the lower grade of fever, the small amount of dyspnœa, and the total absence of rusty expectoration. It can be distinguished from bronchitis by the small amount of cough, and the sharpness of its pain, and from acute phthisis by the strength being but slightly diminished.

Treatment.—1. The treatment of pleurisy in the first stage, when acute pain is the most prominent symptom, is bleeding, leeching or cupping over the affected side, if the patient is robust and previously in good health. In persons of feeble constitution it is better to apply ten or twelve dry cups, and then use hot poultices with laudanum for the further relief of pain, than to deplete the system, or turpentine and sweet oil. If

suited to the patient, hypodermic injections of morphia are of great service. After the second day free watery purgation by a tablespoonful of rochelle salts, epsom salts, or a bottle of citrate of magnesia, and a restriction of the amount of fluid taken into the stomach, are advisable, in order to limit the tendency of effusion into the pleural sac as far as possible. If the febrile movement runs very high, veratrum viride or aconite, in three to five-drops doses of its tincture, may be given to reduce the pulse and heart's action, but this is rarely necessary.

2. In the second stage after effusion has occurred, the chief indication is to reduce the amount of this serous liquid as speedily as possible, and for such a purpose diuretics and saline purgatives or elaterium, in quantities of half a grain every three hours, or so as to cause abundant watery discharges, may be given; counter-irritation by iodine and small blisters being kept up over the diseased side of the thorax. If the liquid is effused in large amount and causes much interference with respiration, it may be necessary to draw it off by means of an aspirating apparatus.

Diet.—As the cure progresses tonics, good nourishing food and early exercise in the open air in suitable weather, are highly important.

Hydrothorax.—This is the name applied to that diseased condition where there is an accumulation of water or serous fluid in the cavity of the chest. It may be the result of pleuritic inflammation, but not unfrequently occurs in dropsy without inflammatory action. Sometimes it increases to an enormous amount, pressing on the lungs and displacing the heart, with such great interference to the respiration and circulation as to prove the immediate cause of death, unless removed by aspiration, or exhaling the breath through an opening in the pleura.

Pneumothorax.—This is the term applied to the morbid state in which air has entered and partly occupies the cavity of the pleura, compressing the lung in the same way though less forcibly than does a watery effusion. This accident sometimes occurs from the rupture of the vesicles of the lung through the pleural membrane into the cavity of the pleural sac. At other times it results from some injury to the chest, such as a gun-shot wound or the fracture of a rib. Where closure of the aperature by which this air found an entrance can be secured, it may be necessary, in order to relieve the oppression of breathing, to pump out the air by means of the aspirating apparatus.

Emphysema.—This is the accumulation of air under the skin in the subcutaneous connective tissue; it is a curious result occasionally met with

from wounds of the pleura, such as those produced by compound fractures of the ribs and other causes. This distension of the integument with air may progress until all semblance of humanity is lost and yet entire recovery takes place. It may almost always be prevented by proper attention to the primary injury.

Other Diseases of the Pleura.—The membrane of the pleura may be affected with cancer, simple tumors, tubercle and parasitic growths, but these are very uncommon, except as secondary manifestations of extensive disease of the same kind in other portions of the body, in which cases the latter are consequently the proper subjects of whatever treatment becomes needful.

CAISSON OR COMPRESSED AIR DISEASE.

This is a disease occurring among laborers, engineers or any person compelled to work for any length of time in tunnels, jetties, foundations for bridges, etc., where it is necessary for a caisson to be used containing compressed air. It is, therefore, not a germ disease, but causes sickness among laborers by the constant breathing into their lungs this compressed air.

The latest theories in regard to how this compressed air affects the system of healthy persons are that the tissues and fluids of the body become saturated with the gases of the atmosphere to a degree which depends upon (1) the amount of pressure of the compressed air in the caisson; (2) the length of time they are exposed to it; (3) the activity of the circulation and the ability of the individual's tissues as regards the rapidity with which the gases are absorbed.

No matter how high the compressing of the air in the caisson is, symptoms do not occur until the man leaves the caisson and breathes the atmospheric air.

The disease is principally due to the formation of air bubbles (chiefly nitrogen) within the body brought about by decompression (meaning that the atmospheric air removes the pressure from the lungs when the person is relieved from the compressed air in the caisson). This relief takes place so rapidly that the gases formed in the blood cannot be carried to the lungs and thrown off as gradually as they entered; as a result, gases in the form of air bubbles, form in the blood and tissues and damage them by the force of their expansion.

When a man is in a caisson working under compressed air, the first

effects he notices are more of a functional nature than the symptoms of caisson disease, they are practically mechanical due to the pressure of the contained air. He feels that the ear-drum membranes are forced inward, which cause discomfort, perhaps pain. They may rupture. Rise of temperature with sweating due to the heat caused by the compressed air. It is difficult to force the air out of the lungs. Whistling or whispering cannot be done, and the attempt causes a sensation of numbness in the lips, which also do not move. The voice is changed and is done through the nose. A sensation of well being and excitement is felt by the laborer. The skin does not change its color nor is the normal rate of the pulse altered.

The Symptoms of Caisson Disease.—These never occur while the man is in the caisson, but usually come on in fifteen minutes to twenty-four hours after he has left the caisson and breathes normal atmospheric air. Pains in the knees and elbows are the most frequent symptoms; they also occur at times in abdomen. The pains in the knees cause the person to bend his knees and the attitude has been termed "the bends." Dizziness occurs and is spoken of by the laborers as the "staggers." Nausea and vomiting may come on. Difficult breathing develops in some men and is spoken of as "chokes." Prostration and collapse occur rarely and the patient becomes unconscious. These symptoms have been followed by death. Itching of the skin occurs, supposed to be due to the presence of air bubbles in the sweat glands in the skin.

Workers in compressed air who have followed such labor for years are usually apt to suffer from deafness, "bends" or severe pains in the knees. Temporary or permanent paralysis of the legs and arms are a rare complication.

Treatment for this Disease.—There is, of course, no home treatment. Most of the large contractors who builds tunnels, bridges, etc., have their own physicians at hand to treat all laborers overcome upon removal from the caisson. Special treatment is necessary under the care of specialists in this disease.

There is no method of preventing this disease as long as men must work under compressed air. It attacks the healthiest of men who are free from disease and well nourished at the time of going to work.

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CURATIVE MEDICINE

PART VII.

DISEASES OF THE DIGESTIVE SYSTEM

In considering the maladies of the digestive system frequent references must be made to the anatomy of the alimentary tract, and to the physiology of digestion.

LIP DISEASES.

Among the common diseases of the lips are ulceration and fissure, which may often be induced to heal by light applications of nitrate of silver solution, in conjunction with diligent improvement of the general health. Cancer of the lip is not uncommon among men in advanced life, but is less frequent in females. It should be operated on in accordance with the rules already laid down, in discussing the subject of cancer. Hare-lip is a curious malformation, in which the upper lip has failed to develop in such a way as to unite in the centre previous to birth, and the child is left with a deep cleft, sometimes reaching all the way from the edge of the nostril. This malformation can generally be remedied by a surgical operation.

STOMATITIS OR INFLAMMATION OF THE MOUTH.

This is commonly met with in young infants, and is called "baby's sore mouth." It consists of an inflammation of the mucous membrane of the mouth and tongue.

Causes.—These may be:

1. Mechanical, chemical, thermal or parasitic.
2. Poisons, as mercury or lead.
3. In certain debilitating diseases, as consumption or diabetes.
4. It is most commonly found in young children, in connection with

digestive disturbances, due to artificial feeding and bad hygienic surroundings, especially during the summer months.

General Symptoms.—There are six chief subdivisions of stomatitis, and seven general symptoms common to all varieties. These are heat, pain and redness of the mouth, increased salivation, foul breath, restlessness and disinclination to nurse.

VARIETIES OF INFLAMMATION OF THE MOUTH (STOMATITIS)

I. ACUTE OR SIMPLE STOMATITIS.

This is the most common form in inflammation of the mouth, and is usually the result of the action of irritants. It is frequent at all ages and is especially common in unhealthy subjects suffering from digestive disturbances.

Symptoms.—General redness. There may be areas of marked congestion where irritation is most intense. Mastication is painful.

Treatment.—In infants the mouth should be carefully sponged after each feeding. Chlorate of potash and sulphite of soda as mouth-washes and gargles, of the strength of a dram to four ounces of water, are useful, or, in severe cases, a dilute solution of nitrate of silver (three or four grains to ounce) may be applied, and attention ought to be paid to improving the general health by the use of tonics, nutritious food, and so forth.

II. APHTHOUS STOMATITIS OR FOLLICULAR STOMATITIS.

This is characterized by the presence of small raised spots or vesicles, which may rupture, leaving small ulcers, surrounded with a red bole. This form of stomatitis occurs most frequently in children under three years of age. There are usually some digestive disturbances present.

Treatment.—Correct digestive disturbances; sterilize the milk; nurse at regular intervals, and cleanse the mouth with a linen rag after each nursing. Apply to mouth and gums three or four times a day:

Boric acid	15 grains
Glycerine	½ ounce
Water up to	2 ounces

If the disease does not yield to this treatment, touch the ulcers with solid nitrate of silver stick.

III. PUTRID SORE MOUTH OR ULCERATIVE STOMATITIS.

This variety occurs especially in children after the first dentition. It is thought by some to be infectious, as it at times occurs in widespread epidemics. It attacks both adults and children.

Symptoms.—It occurs with low condition of nutrition. The gums of the lower jaw are chiefly affected. They are swollen, red and spongy. There is increased salivation, the teeth become loose, the breath foul and mastication painful. In rare cases there is necrosis (decay) of lower jaw.

Treatment.—Correct the hygiene. Touch ulcers with nitrate of silver, and use as a mouth-wash a solution of chlorate of potash, fifteen grains to the ounce. The best remedy is chlorate of potash, given internally, in doses of two grains, three times a day, to a child, and double that amount to an adult.

IV. PARASITIC STOMATITIS OR THRUSH.

This disease is dependent upon the growth of an irritating fungus (Saccharomysis albicaus). The development of thrush over the whole lining membrane of mouth and throat is very common shortly before death in wasting diseases, such as consumption and diabetes. It may occur at any age, but is especially common in children.

Symptoms.—It begins on the tongue as slightly raised pearly spots, which spread and coalesce. The membrane can be scraped off, and is readily recognized under the microscope. It may spread to the pharynx, œsophagus or larynx.

Treatment.—Correct the hygiene; treat as any gastric disturbances. Tonics are often indicated. Locally, use sulphite of sodium, one dram to the ounce of water, or

Borax	1 drachm
Glycerine	2 drachms
Water	6 drachms

Apply two or three times a day to gums and mouth.

V. GANGRENOUS STOMATITIS, OR CANCRUM ORIS OR NOMA.

This terrible, but fortunately rare, disease is usually seen in debilitated children, between the ages of two and six years. It usually follows one of the specific fevers, especially measles and whooping-cough.

Symptoms.—The general symptoms of stomatitis are marked. The

mucous membrane is first affected, usually of the gums or of one cheek. The process begins gradually. Externally the cheek is swollen hard, red and glazed, and inside the mouth is seen an ulcer with a great deal of proud flesh or slough.

Treatment.—Good hygiene; alcoholic stimulants; nutritious food and tonics, as iron, quinine and strychnia. Locally, there is nothing that will do much good, but the actual cautery applied to the surface is said to be of some use, as is the application of fuming nitric acid, followed by soda, the surrounding parts being protected with lint soaked with oil.

VI. MERCURIAL STOMATITIS OR SALIVATION.

This form is very seldom seen at present, except in those who work in mercury.

Causes.—It may be caused by the administration of mercury in any form. It is most commonly produced by large doses, or even small doses, of calomel in those who are especially susceptible.

Symptoms.—Those first noticed are tenderness of the gums, manifested by forcibly bringing the teeth together, redness of gums near the insertion of the teeth, a metallic taste and an increased flow of saliva. If the disease is not checked at this stage these symptoms will become accentuated, and there will be profuse flow of saliva, foul breath, redness, swollen and tender gums. In severe cases there may be ulceration of the gums.

Treatment.—The administration of mercury should be suspended as soon as there is the first symptom of salivation. Bowels should be opened by magnesium sulphate (half an ounce); best taken in half a glass of water before breakfast. Hot baths should be taken every evening, and alkaline waters should be taken in large quantities. Atropine sulphate, one one-hundredth of a grain may be taken twice a day, and iodide of potassium, five grains, three times a day.

DISEASES OF THE GUMS

These generally require the care of a dentist, and when connected with affections of the teeth, or their sockets in the alveolar processes, are usually so painful that prompt application to a dental practitioner is made.

Inflammation of the Gum.—This, when conjoined with ulceration at

the root of a tooth, gives rise to horrible suffering which lasts for three or four days, when it is usually relieved by the discharge of matter or pus. This may be hastened by hot applications.

Treatment.—The pain can be somewhat mitigated by anodynes, such as ten grains of Dover's powder or one-sixth of a grain of morphia, and poultices, but the best treatment is the extraction of the offending tooth, or the perforation of the alveolar process to the seat of trouble by drilling a hole through the spongy bone.

ABSCESS OF THE GUM OR GUM BOIL.

This is sometimes followed by ulceration, which may be hard to heal unless the whole cause of the difficulty is removed, which can now be accomplished under nitrous oxide gas so quickly, painlessly and safely, that no time should be lost in resorting to it. One extremely skillful operator in Philadelphia has now administered the gas for operations on the teeth in over one hundred thousand cases without a single fatal result.

Hypertrophy and atrophy of the gums are sometimes met with.

DIFFICULT DENTITION.

Treatment.—A very common cause of diseases of the stomach and bowels, and also of convulsions in children, is to be found in the hardening or induration of the gums at the time of teething, and this blunder of nature's ought to be promptly remedied whenever the gums in infants at the time of the first dentition are found to be red, swollen, and hot to the touch, by the use of the lancet. This little operation of lancing the gums, which, simple as it is, has probably saved the lives of thousands of young children. After the incisions are made bleeding should be encouraged, but care must be taken by wiping it off with a handkerchief to prevent the infant from swallowing the blood. It is astonishing what relief is often afforded to the little sufferer by a timely lancing of the gums.

Gum Tumors.—Tumors of various kinds sometimes make their appearance upon the gums, the most common of those which are non-malignant being the fibrous growths called epulis, often apparently caused by the irritation of diseased and neglected teeth. They all usually require surgical operations for their removal.

Perforation of Palate.—Perforation of the hard palate or roof of the mouth is sometimes a malformation present from birth, and due to the

same kind of arrest of development as hare-lip. At other times it may be due to venereal or scrofulous disease. A surgeon can do much to cure this deformity by operation, or to remedy the defect if incurable by surgical appliances, which substitute most ingeniously the deficient portions of the mouth.

DISEASES OF THE TONGUE

The Tongue is subject to almost all the diseases already spoken of as affecting the inside of the mouth, for which similar treatment is required. Troublesome little ulcers on the tongue can often be promptly cured by holding in contact with the sore a pinch of powdered borax for ten or fifteen minutes. Deeper ulcers may require touching with the solid nitrate of silver, and if dependent upon the constitutional taint of syphilis will be very difficult to heal without the use of internal remedies also.

CANCER OF THE TONGUE.

Cancer of the Tongue appears sometimes to have its origin late in life from the local irritation of the stem of a pipe in habitual smokers, or from the sharp corner of a broken or isolated tooth. Hence it is important to avoid these exciting causes as much as possible. The operation for removal of cancer when seated in the tongue is more justifiable than almost any other, because, if recurrence should take place in the glands of the neck, or still better, in some internal organ, death comes to the victim in a much less painful and horrible form.

TONGUE-TIE.

Tongue-tie is a malformation in which, from the prolongation of the little membranous band, called the frænum, underneath the tongue, the organ, even to its very tip, is in some cases tied down to the lower jaw. If, as occasionally happens, it interferes with a baby's nursing, it should be operated upon the next day after birth by nicking the band at the front edge, and then tearing it back to about the usual position. No cutting operation should be resorted to, except in this very superficial way, on account of a very active little artery which lies at the root of the tongue, and which, if wounded, might bleed so as to endanger an infant's life before the hemorrhage could be checked. On this account, if nursing

is not seriously interfered with, it is better to wait some months before thus untying the tongue.

DISEASES OF THE THROAT

Sore throat, which may be considered as comprising inflammation of the mucous membrane lining both the fauces and the pharynx, as they nearly always occur together, is one of the commonest disorders. It is occasionally produced by attempting to swallow some irritating article of food, or poison, but is ordinarily the result of cold. It also occurs in the course of various febrile affections, such as scarlet fever.

Symptoms.—The symptoms are pain on swallowing, redness of the surface, and at first dryness, but after a day or two later excessive secretion from the mucous membrane. Subsequently to partial recovery from an acute sore throat, the condition may be one of relaxation, the membrane remaining loose and flabby, and often thrown into projecting folds. This state usually follows cold and sore throat, but may be induced by mechanical causes, such as severe, hoarse cough, screaming, shouting, or over-straining in reading or singing. It may also be brought on by excessive smoking.

Clergymen's Sore Throat.—One form of this malady, called clergymen's sore throat, is the result of excessive use of the voice in church service when the health is already impaired, especially when the air of the apartment in which such exertion is made has been rendered impure by overcrowding. In bad cases of sore throat, the inflammation may go on to ulceration, especially if neglected. The generally relaxed condition of the throat is partaken of by the uvula, or palate, as it is incorrectly called by many people, and this hanging down lower than it ought, may cause a hacking cough by tickling the epiglottis.

The above is a description of sore throat in general. The most common form of inflammation of the throat is tonsillitis.

TONSILLITIS OR INFLAMMATION OF THE TONSILS.

Causes.—The disease is most common in the young. It is rare in infants. Exposure to cold and wet with bad hygienic surroundings seem to be the chief exciting causes. Some writers claim that there is a close relation between this and rheumatism, but Osler has not found the rela-

THE TONGUE

FIGURE No. 1.

1. Hyoides bone joining many muscles of the tongue.
2, 2. Muscles fastened at the corners of the jaw-bone to pull in the tongue.
3. Muscle formed by the outer edge.
4. Deep muscle which turns the tongue toward the side.
5, 6, 7. Muscles which facilitate the turning of the food in the mouth.
8, 8. Salivary glands.
9. Muscle of the bottom of the mouth.
10. Cross muscle formed by the lip.

FIGURE No. 2.

1, 1. Muscles which form the outer border.
2. Hyoides bone.
3, 3. Muscles which move the base of the tongue.
4, 4. Exterior insertion of transversal muscles.
5, 5. Junction line of the transversal muscles.

FIGURE No. 3.

1. Tonsils or glands of the throat.
2. Base of the epiglottis or valve to close the windpipe in swallowing.
3. Lateral arches.
4. Muscles joining the tongue to the epiglottis.
5. Blind apertures in the base of the tongue called "blind foramen."
7. Nerve endings like thread.
8, 9. Fungiform nerve endings.
10. Apex of the tongue.

FIGURE No. 4.

1. Exterior muscle of the tongue.
2. Apertures of mucous glands.
3. Apex.
4. Under muscles with the cover removed.
5. Periglottis turned back.
6, 7. Conduits at the base of the tongue.
8. Nerve endings at the base.
9. Salivary glands.
10. Muscles joining the tongue to the epiglottis.
11, 12. Depressions upon the periglottis.

FIGURE No. 5.

1, 2. Salivary conduits.
3. Wharton conduits.
4. Sublingual gland.
5. Branches or arms of the jaw-bone.

FIGURE No. 6.

1. Nerve endings of the tongue.
2, 2, 2. Submucous pellicle.
3. Muscular larynx (deep).
4. Band which joins transversal muscles.
5. Transversal bands of the muscles.
6, 6, 7, 7. Salivary conduits.
8. Muscles for pulling in the tongue.

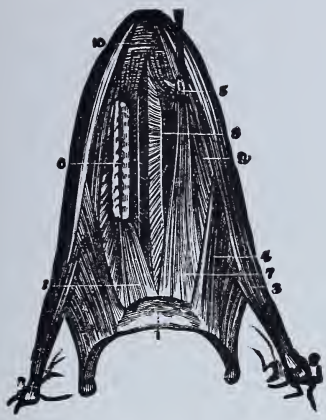


FIG. 1.—View of the muscles of the tongue—lower surface

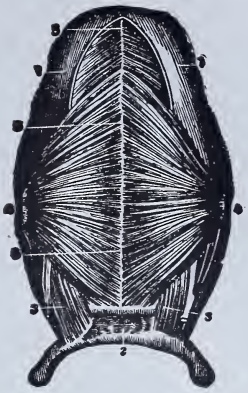


FIG. 2.—View of the under surface of the tongue with its muscles.

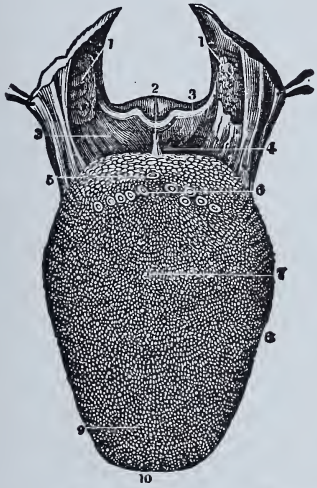


FIG. 3.—Front view of the upper surface of the tongue; as also of the arch of the bone of the palate.

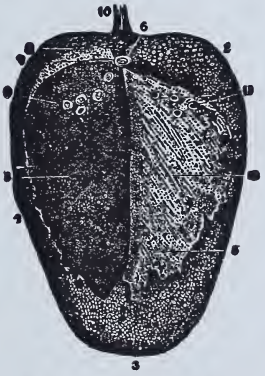


FIG. 4.—View of the back of the tongue, from which, by masceration, the periglottis has been removed and turned back on the right side.

FIG. 5.—View of the lower jaw-bone with the tongue turned up.

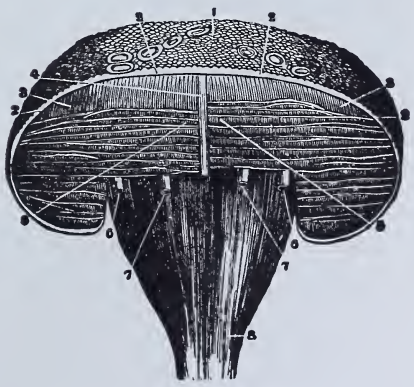


FIG. 6.—View of a section of the front part of the tongue, seen from behind.

THE TONGUE.

For an explanation of the illustrations see text on opposite page.

tion between the two very striking, except in one point, viz., "that an attack of acute rheumatism is not infrequently preceded by an attack of inflammation of the tonsils. Personal susceptibility and heredity play an important part in its productions. At times it runs through a family, or a community, with such rapidity as to suggest an infectious origin.

Symptoms.—In the mild forms there may be no other symptoms than redness and dryness of the throat with painful swallowing. The tonsils may be felt as hard lumps just behind the angle of the jaw.

Symptoms of More Severe Forms.—In the more severe forms it may begin with a chill followed by a rise of temperature which in children may reach as high as 105 degrees Fahrenheit. Pains in the back and limbs are not uncommon.

Local Symptoms.—The local symptoms are those of the mild form accentuated. If only one tonsil is swollen the uvula is drawn to the affected side.

Follicular Form.—In this variety white patches may be seen covering the tonsil. These are due to the accumulation of degenerated epithelial and white blood cells in the depressions, or cryps, in the tonsil.

Diagnosis.—The follicular form must be distinguished from diphtheria. The membrane of diphtheria is not in patches, but continuous over the surface of the tonsils, and extended up upon the pillars of the fauces and uvula, and is greyish-white in color. When this is stripped off it leaves a raw, bleeding surface, which is not the case when the contents of the cryps are expressed in follicular tonsillitis.

Constitutional Treatment.—Bowels must be freely opened with calomel, one-quarter grain every half hour, for six doses; followed by magnesia sulphate (epsom salts), one-half ounce, to be given one hour after last dose of calomel; ten grains of Dover's powder at bedtime. Salicylate of soda is often beneficial, and may be given as:

R.—Salicylate of soda ..... 5 drachms
Iodide of potassium ..... 2½ drachms
Syr. sarsaparilla ..... 1½ ounces
Water sufficient to make four ounces. Take one drachm every four hours. The dose must be reduced in children to about half.

Local Treatment.—Gargles of borax, ten grains to the ounce, or salt and water, hot. The following will be found very serviceable:

R.—Tincture chloride of iron ..... 1 ounce
Glycerine ..... 1 ounce
Chlorate of potash ..... ½ drachm

Shake well before using, and use one drachm of the mixture to one ounce of water, as a gargle. Clean teeth after using.

Sprays of glyco-thymoline or supra-renal extract are good; or swab throat with equal parts of tincture of iron and glycerine.

QUINSY OR ABSCESS OF TONSIL.

This disease is a cause of great suffering to some persons in youth and middle age, but is rare in childhood, and often ceases its molestations after individuals commence the decline of life.

Causes.—Exposure to cold and wet are its common exciting causes.

Symptoms.—In the catarrhal form of quinsy the inflammation is often superficial, and after causing much pain and difficulty of swallowing, subsides in three or four days without suppuration. In the severer variety an abscess or boil forms in the substance of the tonsil, attended with great pain and swelling, difficulty of swallowing, a good deal of fever, and some loss of strength. The patient often suffers from earache, and is somewhat deaf on account of the inflammation extending along the Eustachian tube. The breathing through the mouth is much interfered with, but the danger of suffocation is apparent only. The disease lasts on an average about seven days, but the abscess may break on the fifth day, or may linger until the tenth day, unless earlier opened by the lancet. The complaint is very apt to recur, and the sufferer from one attack rarely escapes without several every winter, until the tendency, which may be hereditary, is exhausted.

Treatment.—The treatment consists in an effort to abort the disease by leeching, externally, and the use of guaiacum in teaspoonful doses of the tincture four times daily, by the mouth. If these remedies fail, poultices of little bags of hops dipped in hot vinegar and sprinkled with laudanum, and hypodermic injections of a quarter of a grain of morphia, may afford some relief. When suppuration is established, the period of suffering can be abbreviated by lancing the swelling in the throat, provided the spot where the abscess points is high enough to be felt by the finger. The operation is performed by having a long, narrow-bladed knife wrapped with sticking plaster to within a quarter of an inch of its point, and then passing this down the throat, guarding it with the finger,

and guided by the touch, as the patient can rarely open the mouth wide enough to admit of seeing, a small incision is made into the softened portion of the tumor. The relief afforded either by puncture in this way, or by spontaneous rupture, is wonderfully great. No after-treatment is necessary; but as before mentioned, the complaint is very liable to recur, and it often happens, that in persons who are strongly predisposed to it, the first imprudent exposure on venturing out will light up the disease in the opposite tonsil, with an almost exact repetition of the suffering, within two weeks.

DISEASES OF THE ŒSOPHAGUS OR GULLET.

Inflammation of the Gullet.—This is a rare affection, and usually due to swallowing some hot or corrosive liquid, although it may occur from the extension of simple or erysipelatous inflammation from the throat, or of the former variety from the stomach. Ulceration is also uncommon, although it does occur in connection with syphilitic complaints.

Stricture of Gullet.—This is the most frequent form of disease of the gullet.

Varieties of Stricture.—1. Spasmodic stricture is a narrowing of the tube, caused by simple contraction of its muscular fibres. This condition is especially met with in hysterical females, and, though alarming at the time, seldom proves fatal to life.

Traumatic Stricture.—2. This is the variety in which the constriction has been caused by irritation and inflammation due to an injury inflicted on the surface of the tube, in any part of its length, by the swallowing of scalding water or of some corrosive substance, or by a wound. The result of such a stricture is to render the act of swallowing always difficult, unless relieved by a surgical operation.

Simple Organic Stricture.—3. This is occasionally seen, in which there is a mere narrowing of the gullet, without any apparent tendency to ulceration. The most common and fatal form of stricture is that due to cancerous deposit and ulceration. It may cause death by producing a complete obstruction, so that neither food nor drink can enter the stomach, or by ulcerating into some of the adjoining vital structures. The surgical operations sometimes performed for its relief are of very doubtful benefit or propriety.

ACUTE GASTRITIS, INFLAMMATION OF THE STOMACH.

The simplest and most common form of inflammation of the stomach is characterized by active congestion and excessive secretion of mucus, a condition known under the name of gastric catarrh, and very similar to that so frequently met with in the throat and air-passages.

Causes.—The causes of this malady are indigestible food, especially in children, irritant poisons, or alcoholic excess. But it may occur in connection with gout or as a symptom in some of the eruptive fevers.

Symptoms.—The symptoms of acute gastritis are pains, which are often severe over the pit of the stomach, shooting through to the back, and increased by taking food, but temporarily relieved by vomiting. Tenderness over the pit of the stomach is always present, and nausea and vomiting are prominent symptoms, the vomited matter consisting of a glairy mucus, stained with bile of a greenish-yellow or bright green color. The tongue is coated with fur, whilst the edges and tip are frequently red and irritated. The bowels are apt to be confined, and the urine scanty and high colored. These symptoms often set in with chilliness, followed by restlessness, hot skin, headache, and other febrile symptoms. In bad cases there may be great prostration, with cold, clammy skin, a weak, rapid pulse, some difficulty of breathing, and obstinate hiccough. Generally, however, under proper management, these distressing symptoms subside after a time, although they sometimes pass into those of the chronic form of gastritis.

General Treatment.—The treatment of this disease is, in the first place, if consequent upon the introduction of some poison or irritating material, to get rid of the offending substance by means of an emetic, followed by a purgative, which is perhaps in most cases best administered by enema.

Diet.—The food should be entirely liquid, and given in very small quantities; in fact, most cases would do better if nutritive injections were depended on to sustain life for a few days or a week or two. The thirst may be relieved by sucking small pieces of ice, but iced champagne is sometimes borne by the stomach when everything else is rejected, and iced carbonic-acid water is often acceptable.

Medicinal Treatment.—With the exception of subnitrate of bismuth, in quantities of five grains, and drop-doses of diluted hydrocyanic acid, it is usually advisable not to provoke the irritable stomach with medicines,

the hypodermic injection of morphia being used to relieve the pain, if the patient can take morphia, or morphia and atropia, in doses of one-eighth of a grain of the former and one one-hundredth of the latter in that way without nausea being produced. Thin and light poultices, as, for instance, of flaxseed meal and laudanum, laid over the region of the stomach, are frequently of service, or if the pain is very severe a few leeches may be applied. Convalescence from this malady is generally slow, and requires great care in regard to diet and exertion.

DYSPEPSIA.

This affection, the great torment of civilized life, is to be considered rather as an unnatural functional difficulty than as a structural disease.

Varieties of.—Among its three chief varieties may be mentioned:

First Form.—The form due to sympathetic relations with other organs which are themselves in a morbid state, and which is therefore explainable as a reflex action. Of such a type is the nausea and occasional vomiting which attends irritation of the brain, lungs, liver or uterus. Sea-sickness is believed to be a form of this reflex dyspepsia.

Second Form.—This form is attributable to a scanty secretion of gastric juice, and is characterized by slowness of digestion, long retention of food in the stomach, prolonged distress after eating, especially with feelings of weight and uneasiness at the pit of the stomach, a tendency to decomposition of the food in the alimentary canal with the evolution of fetid gases and the appearance of undigested food in the evacuations from the bowels. The food may be considered to be delayed in the stomach when it remains there for more than two or three hours. Dyspepsia of this kind is often inherited, but much can be done to aggravate the tendency by mental over-exertion, prolonged and intense anxiety, especially if commencing directly after meals, sedentary habits, gluttony, and the use of alcoholic and other stimulants.

Third Form.—This form of dyspepsia appears to be owing to some abnormal quality of the gastric juice, and to diminished peristaltic movement of the stomach, so that food is not sufficiently mixed up with the digestive fluids.

Symptoms.—One of the most characteristic symptoms of this condition is pain at the cardiac end of the stomach, to which the name of cardialgia has been applied, on account of the distress being in such close proximity to the heart. Many dyspeptics, being also more or less hypo-

chondriacs, imagine from this symptom that they are subjects of organic disease of the heart, and suffer intense, yet groundless, mental anxiety on that account. The names of heartburn, pyrosis and water-brash are applied to slight modifications of this symptom. Tobacco contains a poisonous principle which, in many persons, favors the development of dyspepsia, and some individuals suffer from smoking even a single cigar.

General Symptoms.—Inability to absorb liquids occurs in some varieties of dyspepsia, so that fluid which has been swallowed may be heard splashing around in the gastric cavity on any forcible agitation of the body, the stomach being usually distended to a great extent. As further aids in distinguishing between dyspepsia from deficient secretion of the gastric juice, and deficient motion of the stomach, it should be remembered that in the former neither flatulence nor constipation are generally present, whilst in the latter variety flatulence is one of the most characteristic symptoms and constipation is usually well marked. Some of the worst cases of dyspepsia from deficient secretion of the digestive fluid, in which pain after taking food and other symptoms are particularly severe, appear entirely free from flatulence. The tendency of the fermentation which goes on in the slowly digesting food seems to be of a kind in which gases are not evolved. In all these forms there is a loss of appetite. The tongue is usually broad, pale and flabby. The pulse is weak, soft and compressible, and palpitation of the heart frequently occurs. There may be dyspnœa on exertion and a short dry cough, the stomach-cough of the older authors. The general nutrition, of course, suffers, and the face is pallid and bloodless to a greater or less degree.

Treatment—Diet.—1. The treatment of dyspepsia must be chiefly diatetic, although medicines are not powerless in this complaint. In the first place all indigestible food, such as pork, veal and salt meats, and richly-made dishes, such as pastry of every description, ought to be avoided. In the acid forms of dyspepsia, which are connected with deficient muscular movement, pastry and saccharine substances are particularly harmful, and vegetables and fruit should be partaken of sparingly. In some instances an exclusive milk diet, persevered in for some weeks, has appeared to produce marvelously good results; but, except under such a regimen, water ought to be the habitual drink. Cocoa, deprived of its fatty ingredients, is often much to be preferred to tea and coffee, and those accessory foods, if taken at all, should be weak, cool and well diluted with milk. Rich or effervescent wines should be avoided, but the lighter Rhine wines or ale, or extract of malt, are often useful in

atonic dyspepsia, with impaired movement of the digestive organs. In order to improve the general health all the agencies which favor the improvement of the nutrition and enrichment of the blood, such as abundant exercise in the fresh air, tepid or cool bathing, and warm clothing should be pressed into service. The successful prescription of a famous English physician to a rich and indolent patient who came to him complaining of the tortures of dyspepsia was, "Go and live on a shilling a day and earn it."

Medicinal Treatment.—2. In the medicinal treatment for dyspepsia accompanied by undue acidity, as evidenced by the frequency of heartburn, if the urine is scanty and lets fall an abundant deposit, alkalies, such as the bicarbonate of soda or potash in quantities of ten to twenty grains thrice daily, are useful, and are best taken three or four hours after a meal. In acidity with anemia and debility, mineral acids, such as the diluted nitro-hydrochloric in five-drop doses, serve the purpose better. Vegetable bitters, of which columbo in doses of a wineglassful of the infusion thrice daily generally proves the mildest, and nux vomica or strychnia are good digestive tonics, and in slow digestion benefit is sometimes derived from very minute doses of ipecacuanha.

A good prescription is:

R.—Tincture nux vomica ..... 4 drachms
Tincture cinchona ..... 2 ounces
Tincture gentian ..... 2 ounces
Simple elixir ..... 2 ounces
Teaspoonful three times a day.

For vomiting, besides the remedies already spoken of under gastritis, very small quantities of Fowler's solution of arsenic, in two-drop doses, or creosote mixture may be tried. For flatulence the aromatic carminitives, such as ginger and cardamon, and powders of two grains each of charcoal with bismuth, also counter-irritation by means of small blisters over the stomach are often of great service. When the secretion of gastric juice is scanty, pepsin or lactopeptine, in quantities of ten grains, frequently proves itself invaluable as an aid to digestion; or a prescription containing:

R.—Dilute hydrochloric acid ..... 2½ drachms
Pepsin (soluble) ..... 2 drachms
Glycerine ..... 1 ounce
Elix. aromatica ..... 2 ounces
Water, sufficient quantity for ..... 4 ounces
Take one drachm of the mixture in water three times a day. Best taken through glass tube.

CANCER OF THE STOMACH.

The stomach is one of the most frequent seats of cancer, which is especially apt to attack this organ in men advanced in life who have subjected their digestive apparatus to more or less constant irritation. The tendency is very often hereditary. The cardiac end of the stomach is generally the seat of epithelial cancer, and the pyloric extremity of hard cancer or scirrhus. Its tendency is to extend around the organ, and hence it leads to an annular or ring-like constriction.

Symptoms.—The symptoms are those of gastritis or mere dyspepsia at first, but after a few weeks or months, in a majority of instances, a small amount of blood is vomited, and serves to indicate pretty clearly the true nature of the case. The blood in cancerous hematemesis of this kind being effused slowly and in small quantity is altered by the action of the gastric juice so as to present a brown color. This tint and the minute clots in which it appears have caused the expressive name of coffee ground vomit to be applied to it. Although not an infallible sign, it constitutes one of the surest early evidences we possess of the existence of cancer of the stomach. This disease is distinguished from gastric ulcer, which it most resembles, by its occurrence in advanced life instead of in the young; by the presence of a hereditary predisposition; by the character of the hematemesis; by the greater diffusion of the tenderness; by the constancy of the pain; by the cancerous cachexia, and, as emaciation advances, by the increasing tumor, which can be distinctly felt in most cases through the thinned walls of the abdomen. The average duration of cancer of the stomach is from six months to one year, and it always proves fatal.

Treatment.—The only treatment which offers any hope of recovery is surgical.

ULCER OF THE STOMACH.

Causes.—This remarkable disease is attributed to the corroding action of gastric juice on the very membrane which has secreted it, in consequence of the vitality of that membrane becoming impaired by thrombosis of some small artery in the wall of the organ. Disorder of menstruation may develop an ulcer, tight lacing or any occupation which necessitates constant leaning over, as in shoemaking or tailoring. It is more common in females than males, and is more frequent in young women than those of middle or advanced age. Traumatism or swallowing any

corrosive substance may lead to ulceration. Anderson believes that alcoholism, syphilis or mental worry may lead to the condition.

Appearance.—A simple gastric ulcer is round or oval, about one-quarter to one-half an inch in diameter, with thin, clean-cut margins as if punched out, but deepest in the centre, like a shallow funnel, though varying in depth from a mere destruction of the mucous membrane to complete perforation of all the coats. It is usually single and most commonly situated at the back of the organ near its lower or pyloric orifice. The ulcer may happen to eat into some large blood-vessel, in which case serious or fatal hemorrhage is apt to occur.

Terminations.—The terminations of such an ulcer are the favorable ones of its healing up with or without puckering in the wall of the stomach, or, on the other hand, of perforation, which may occur with the escape of the contents of the stomach into the peritoneal cavity. Such an accident is generally followed by peritonitis and almost certain death.

Symptoms.—The symptoms of gastric ulcer are pain and tenderness over the pit of the stomach, this pain coming on shortly after taking food, and increasing until the organ is emptied by vomiting. Sometimes the distress seems to extend through into the back. The seat of tenderness coincides with that of pain, and is localized over a comparatively small surface. Vomiting of blood occurs in about one-third the cases, and though not so frequent as in cancer is much more profuse. It may be either in black clots or fresh blood, and not infrequently blood is passed by the bowels. Vomiting of food half an hour or an hour after eating is usual, and various dyspeptic symptoms are met with. The pain is often described by the patient as of a gnawing character, and is commonly made worse by condiments, animal food, saccharine substances and alcohol; whilst the pain in neuralgia of the stomach is frequently relieved by these articles of diet.

Medicinal Treatment.—The most successful treatment of gastric ulcer is perfect rest in bed and nourishment entirely by nutritive injections, for a period of from one to three weeks, or until the subsidence of the pain and tenderness indicate the healing of the ulcerated spot. Prussic or hydrocyanic acid and bismuth, as directed in gastritis, may be given to control vomiting, and morphia hypodermically, guarded if needful by atropia, to relieve pain. Stomach should be washed out twice a day. Small blisters over the stomach are frequently useful, and the first food administered should be lime-water and milk in very small quantities, gradually increased as the power of the organ to retain food is found to

be restored. If vomiting of blood comes on, perfect rest, the quieting of the peristaltic motion of the stomach and whole digestive tube by full doses of a grain every two hours of opium, or one-sixth of a grain of morphia, and the use of acetate of lead by the stomach in quantities of two grains every three hours, tannic acid and gallic acid by enema, and five grains of ergotin hypodermically, are to be resorted to. Ice in small pieces may be given frequently, and cold cloths applied over the gastric region. Perforation is indicated by severe pain and shock.

Surgical Treatment.—If the patient grows worse in spite of medical treatment, if hemorrhage is profuse, if pain is severe, or if the tenderness is marked, surgical treatment must be resorted to and should only be done by a skilled surgeon. A number of cases of perforation and hemorrhage have been saved by a surgical operation.

PERITONITIS.

Character.—This dangerous malady is an inflammation of the peritoneum or serous sac covering the intestines, liver, spleen, and so forth, and reflected upon the inner surface of the wall of the abdomen. It is probably more liable to become quickly and violently inflamed than any other structure of the body. It may be either general or local. Local peritonitis may occur whenever any of the organs of the abdominal cavities become the seat of inflammation.

Causes.—1. Exposure to wet and cold.

2. Traumatism.

3. It may result from the perforation of an ulcer occurring in stomach, intestines or liver.

4. Inflammation of the uterus following confinement and constituting child-bed fever, which we see.

5. It may be secondary to some morbid disease as tuberculosis, rheumatism or Bright's disease.

Symptoms.—A chill with moderate fever, rapid pulse, intense abdominal pain, abdominal rigidity, painful respiration. The patient lies with thighs flexed, features are pinched, vomiting persistent and bowels are usually constipated.

Treatment.—Absolute rest is essential. Restrict the diet. Give frequent doses of opium, one grain, or morphine, one-quarter grain. Hot or cold applications to the abdomen. In non-perforating cases give saline

purge. In perforating cases, which are the most frequent, a surgical operation offers the only hope.

ENTERITIS OR INFLAMMATION OF THE BOWELS.

Symptoms.—This disease is not very common, but may arise from taking cold, from the abuse of purgatives, from swallowing or inhaling irritant poisons, and from peritonitis. Its symptoms are diarrhœa with pain, often very severe, increased on pressure and most intense about the navel or in the right flank. The frequent discharges temporarily relieve the griping pains, which, however, soon return. The pulse is excited, generally full and strong and marked fever is present.

Treatment.—The treatment is by anodyne fomentations or poultices to the abdomen, such as the flaxseed poultice with laudanum, and grain doses of opium by enema or suppository. Rest in bed must be strictly enjoined.

COLITIS.

Acute dysentery, bloody flux, an acute inflammation of the mucous membrane of the large intestine, generally catarrhal, characterized by fever and sometimes followed by ulceration. The causes are summer and autumn seasons, sudden changes in the atmosphere, errors in diet, impure drinking water, etc.

Symptoms.—Begins gradually with diarrhœa, loss of appetite, nausea and slight fever, which continues for two or three days. When the dysentery symptoms develop, pain on pressure along the colon, colicky pains about the navel, burning in the rectum, and a desire to expel it or tenesmus, stools contain mucus and blood, urine scanty and high colored, duration about one week, patient emaciated. This may lead on to a chronic condition.

Treatment.—Patient should be confined to bed, even in mild cases. Discharges should be disinfected with chlorinated lime, diet should be bland and unirritating. Milk and lime-water, broths, egg albumen. Begin treatment with a dose of castor oil, or if fever is high epsom salts, two drams, or four drams of rochelle salts, until copious discharge, for the pain and tenesmus. Opium in some form, or one-half grain extract opium and two grains sugar of lead every two or three hours, or:

R.—Dil. sulphuric acid ..... ½ ounce
Spirits camphor ..... 1 ounce
Tr. capsicum ..... ½ ounce
Spirits chloroform ..... ½ ounce
Brandy ..... 1½ ounces
One teaspoonful diluted every two or three hours.

Twenty to thirty grains of subnitrate of bismuth is also valuable every two or three hours during convalescence. Cod liver oil, syr. of lacto phosphate of lime and the following are effective:

R.—Strych. sulphate ..... ½ grain
Acid muriatic dil. ..... 2 ounces
Tr. gentian co. ad. ..... 4 ounces
Teaspoonful in water before meals.

APPENDICITIS OR INFLAMMATION OF THE APPENDIX.

Function of Appendix.—Appendicitis is the term applied to inflammation of the vermiform appendix. It is almost invariably the primary lesion of all those various conditions known as typhlitis or perityphlitis, terms which are well relegated to obscurity. The appendix is a small tube or diverticulum coming off from the postero-internal part of the cæcum or beginning of the large bowel, and has no function in man, but in herbivora and rodents is a functionally active organ. The position of the appendix corresponds about to a point two inches from the anterior spine of the pubis on a line down from the spine to the umbilicus. This point is known as McBurney's point.

Causes.—At one time it was supposed that foreign bodies, as seeds, pins, etc., were important etiological factors in the production of the disease, but Fits' statistics show that only twelve per cent. of cases are caused by foreign bodies. Appendicitis is a bacterial disease, usually produced by the bacteria which are nominally present in all parts of the gastro-intestinal tract, which have a powerful action when the vitality of the appendix becomes impaired from any cause, as when the deverticulum is bruised, obstructed, or in a state of catarrhal inflammation.

Where non-traumatic inflammation occurs the swelling of the mucous membrane occludes the tissues, obstructing the full communication between the appendix and cæcum, and the appendix becomes converted into a closed sac. Dieulafoy maintains forcibly that appendicitis is always caused by the conversion of the appendix into a closed cavity. Partial

obstruction may be caused by calculi, which are composed of fecal material mixed with salts of lime or magnesia. These calculi are not formed in the colon but in the appendix. Pozzi believes that appendicular colic may be caused by bending of the appendix, and holds that pain may arise when there is no lesion of the appendix. A foreign body may produce immediate perforation, giving rise to a diffuse septic peritonitis. Where the lesion of the appendix is occluded it begins to swell and becomes very much congested, the blood supply becomes lessened or cut off entirely. The microbes multiply with great rapidity and the wall of the appendix may become gangrenous, or it may ulcerate and perforate. Interference with the blood supply of the appendix will predispose to appendicitis.

When the appendix becomes inflamed gradually, the peritoneum around it partakes of the process and adhesions are usually formed, thus walling off the appendix. In a case of this kind, if perforation should occur or the inflammation go to the formation of pus, the adhesion would protect the general peritoneal cavity from the poisonous materials.

Who Are Most Subject.—Appendicitis occurs most frequently in males, as the blood supply is more abundant. It is rare in infants, but occurs most frequently between the ages of sixteen and thirty years. Appendicitis that subsides may at any time recur, and the life of the patient is under constant menace. It always recurs after a second attack.

Varieties.—Appendicitis is divided into the catarrhal, obliterative, suppurative and gangrenous forms, but as a matter of fact appendicitis is always one disease which varies in intensity, and it is useless to divide it into a number of symptomatic groups.

Symptoms.—1. In what is known as appendicular colic there are colicky pains in the right iliac region most marked over McBurney's point, but radiating towards the umbilicus, nausea, vomiting and usually constipation, but no tenderness in the right iliac fossa or abdominal rigidity.

2. In a genuine case of appendicitis the patient feels listless and out of sorts for two or three days before the attack, loss of appetite, furred tongue, foul breath and constipation is the rule, but in exceptional cases there may be diarrhœa.

3. The onset is usually with colicky pains which at first may be general over the whole abdomen but most intense over McBurney's point. Circumscribed tenderness over McBurney's point and across may be felt.

There is moderate fever, and vomiting is usually present with constipation, abdominal muscular rigidity.

4. As the attack progresses the fever becomes more intense, radiating towards the umbilicus and the tenderness over McBurney's point recrosses. The pulse increases and fever rises, vomiting becomes worse, respiration more rapid and thoracic in character. The patient lies upon the back with right leg drawn up. The urine is scanty and highly colored. Any case may become suddenly desperately grave because of perforation or gangrene.

Terminations.—Appendicitis may terminate in recovery, in death, or in a condition of lowered vitality, renewed attacks being certain to occur.

Treatment.—1. In appendicular colic apply a hot water bag over McBurney's point, give a saline cathartic and watch patient for further symptoms.

2. Many surgeons give a cathartic in undoubted cases of appendicitis, but the increased peristalsis and tension caused is liable to give rise to perforation.

3. In a genuine case of appendicitis perfect rest, liquid diet, ice bag to McBurney's point. Do not use opium in any form as it masks the symptoms. If the symptoms are not better in thirty-six hours, operate.

4. McBurney says, if six hours after the beginning of the attack the patient is no worse there is no pressing danger, if in twelve hours symptoms are not intensified they will soon begin to abate, but if in twelve hours the symptoms have become worse, operation is necessary.

5. It is always better to operate in the interval between the attacks than during an attack. It is not safe to delay operation in a pus case. It must be remembered that the mildness of the symptoms is no assurance that even in an hour or two gangrene or perforation will not occur.

A person of generally good health who suffers for some time with vague digestive troubles may find himself a victim.

Pain occurs in the right side of the abdomen between the ribs and the hip. It is accompanied by colicky paroxysms, more or less violent, which may or may not be followed by vomiting of food or bile. The colic eventually subsides, but a fixed pain continues, sometimes exactly limited to the point of the appendix and sometimes spreading more or less over the bowels. The muscles of the appendix region become hard. Usually there is but little fever.

Notwithstanding the general opinion of physicians that operation is necessary, there are many eminent medical men who are of the opinion

that appendicitis is in many cases open to medical treatment capable of effecting cure. The following prescription is one of the best which has been compounded for this trouble.

Cascara Compound.

Cascarin	¼ grain
Aloin	¼ grain
Podyphyllum	1/6 grain
Ext. Bella Leaves	⅛ grain
Strychnine Sulph.	1/60 grain
Oleresin Ginger	⅛ grain

Take one at night or night and morning.

All drastic cathartics must be avoided. The prescription just given should properly regulate the bowels. It is intended to remove all gases, sweeten the stomach and aid digestion. It is claimed on high authority that it will prevent appendicitis and surgical operation if it is taken in due time.

Rest is necessary and the intestines should be kept in a quiet condition. An ice cap may be applied over the seat of the pain. It is advisable that the patient go to bed and assume such position as will—so far as possible relax the abdominal muscles. Abdominal movements such as may be caused by sneezing, coughing, etc., should be avoided. The diet at first should consist only of small quantities of cold or lukewarm milk, oatmeal, bouillon, etc.; avoid meat and starchy foods. It is held by some that there is great virtue in the external use of kerosene oil in cases of appendicitis. If unfavorable conditions continue, or attacks are frequent, the appendix should be removed. We recommend consultation with physician without delay.

INTESTINAL OBSTRUCTION.

This term is applied to the obstruction of any part of the intestinal canal. It may be acute or chronic.

Causes.—Obstruction may be caused:

1. By a band, which, becoming looped or attached to one or more organs, forms a noose through which the intestine slips. This manner of compression is known as strangulation.

2. By one portion of gut slipping into another. This is known as intussusception or invagination.

3. By kinking of the gut.

4. By the narrowing of the lumen, by contraction of scar tissue or the encroachment of tumors.

5. By the pressure of foreign bodies large enough to obstruct the lumen.

Symptoms of Acute Obstruction or Complete Obstruction.—The active symptoms are usually preceded by a period of constipation, with a feeling of lassitude, furred tongue and foul breath.

1. Pain comes on abruptly, first colicky, then continuous and intense.

2. Vomiting quickly supervenes and is, first, of the stomach contents, then bilious, and finally fecal.

3. Abdominal distension occurs if the obstruction is in the lower bowel, but may not be present if the obstruction is high up. Constitutional symptoms are those of shock. Thirst is intense, urine scanty and highly colored.

Symptoms of Chronic or Partial Obstruction.—Symptoms appear gradually with the increase of the narrowing until there is complete obstruction, or the symptoms of acute obstruction occur from time to time.

Treatment.—Purgatives are contra-indicated. Food must be withheld and nutrition given only by the rectum. Give opium or morphine for the pain in doses of one grain of the former and one-quarter grain of the latter.

Accessory Treatment.—Washing out the stomach twice a day to control the vomiting. Distension of the bowel with gas or water should be practiced in doubtful cases and in intussusception. Senn recommends the infiltration of hydrogen gas. If these methods fail to relieve the obstruction a surgical operation must be done at once.

DYSENTERY.

This is a febrile disease, characterized by severe colicky pains, followed by straining, which results in scanty mucous or bloody stools, containing little or none of the natural fecal matter or excrement.

Causes.—It is especially prevalent in warm climates, and warm weather and bad hygienic surroundings play an important rôle in its production. Indigestion of irritating foods, exposure to cold or wet, certain debilitated states, as scurvy, Bright's disease, etc., seem to be pre-

disposing causes and may alone produce the simple form. The tropical form is due to an animal parasite, the amœba coli.

Symptoms.—There is moderate fever, severe colicky pains in the abdomen, prostration, tenesmus or straining, constant desire to defecate with small mucus and bloody stools. These symptoms are aggravated during the night and early morning, and leave behind them the tormenting sensation that there always remains in the bowels something which has yet to be discharged. This sensation, which is technically called tenesmus, increases, and ultimately becomes the most striking feature of the disease. When the malady is fully established, the evacuations consist of bloody slime, sometimes tinged with bile, and containing shreds of membranous-like exudation thrown off from the interior of the bowels. They exhale an odor almost peculiar to dysentery, very offensive and yet quite different from that of ordinary feces. This complaint may prove fatal in consequence of the great loss of blood, but it more commonly causes death by wearing out the patient.

Other Symptoms.—When a fatal termination threatens, the symptoms assume a typhoid character, with great prostration, dry, brown tongue, hiccough and vomiting. In favorable cases improvement begins about the end of the first week, but convalescence is usually very protracted, and many cases stop half way, as it were, continuing to suffer for months or years with the chronic form of the affection.

Common to Children.—This disease is very common among young children, being especially prevalent and fatal among those who are cruelly kept in cities during the hot summer months, and it is the usual result of starvation or deterioration of food, especially if long continued and accompanied by hardship and privation, being then an extension of the diarrhœa which is apt to be first produced.

Treatment.—A mild laxative is indicated in the beginning as epsom salts, three drachms, or castor oil and laudanum might be selected. Bismuth is a valuable remedy. Absolute rest in bed and bland, non-irritating liquid diet. The following may be found useful:

R.—

Bismuth	40 grains
Creosote	15 drops
Simple syrup	2 ounces

A teaspoonful every three hours.

After the more violently acute stage has passed, laudanum injections, or opium by suppositories, with such astringents as two grains of acetate

of lead, half a grain of nitrate of silver, and of sulphate of copper combined with small doses a quarter or half a grain of opium by the mouth, are generally beneficial, but care must be taken not to check the disease too suddenly by the use of these remedies.

Additional Treatment.—Flushing out the bowels with a saline solution may be tried, or starch water containing one grain of opium may be found beneficial. Hot fomentations over the abdomen may be used to relieve the pain. Injections of warm solutions of quinine, 1-5000 have been used in dysentery with advantage. Creolin, a drachm to the pint, has given good results.

Diet.—The diet, as pointed out before, should consist of the blandest and most unirritating substances, such as boiled milk with lime-water, beef essence, boiled rice, and if the debility is extreme, raw eggs beaten up with milk. Stimulants should not be administered unless absolutely necessary, on account of their locally irritating effect.

DIARRHŒA.

Causes.—In many cases this common malady is also rather a consequence or symptom of some morbid condition than itself a disease. The frequent discharge of loose or fluid evacuations from the bowels, without griping pain or tenesmus, is sometimes a wise effect of nature to get rid of some injurious or indigestible material, which has been imprudently swallowed into the stomach and has from there passed into the bowels. Diarrhœa may likewise be produced by some violent mental impression, or by exposure to taking cold, the bowels instead of the throat being often the weak spot of the individual. It also results from privation of food, food of poor quality, and many analogous causes.

Medicinal Treatment.—In the treatment of diarrhœa from indigestible food no attempt should, as a rule, be made at first to check it until the offending material, whatever it may be, is cast out of the system. In fact, a gentle and soothing laxative, such as a dose of castor-oil with a few drops of laudanum to hasten along the conservative action of emptying out the intestinal canal, is often of great service.

Stopping Evacuations.—After this is accomplished, however, each additional evacuation is an evil, which should be prevented by the use of five grains of bismuth or chalk, with three grains of tannic acid, or in a teaspoonful of either syrup of galls, or syrup of krameria, and a quarter of a grain of opium, or by opiates combined with carminatives like laven-

der, or ginger, and camphor, a good mixture being ten drops of laudanum, fifteen of compound spirits of lavender, and five of spirits of camphor, taken on a lump of sugar every hour or two until relieved.

Additional Treatment.—If the stomach is unsettled, as is frequently the case, the opiate and astringent may be administered with advantage by enema or suppository, and in patients who cannot, or think they cannot, retain medicines in either the stomach or rectum, hypodermic injections of the eighth of a grain of morphia may often be resorted to with the happiest effect.

Diarrhœa Mixture.—A good rule in taking a diarrhœa mixture is to use a moderate dose every two hours, provided the loose passages recur within that time, but if at the end of two hours there has been no liquid or semi-liquid evacuation in the interval, to wait until such a one occurs before resorting again to the remedy. In this way the blunder of so overdoing the good work of checking the diarrhœa as to inflict upon the system its opposite evil of constipation may generally be avoided. The patient thus gains from the remedy all the good with as little of the necessary evil, which lurks in the bottom of every cup of blessing, as possible, a desideratum which should constantly and persistently be kept in view in every kind of medical treatment, as well as all other affairs of life.

Other Remedies.—Among the various other valuable remedies often beneficial in this exceedingly common disorder, may be mentioned the tincture of kino, catechu and logwood, acetate of lead, sulphate of copper and sulphate of zinc, nitrate of silver, spirits of chloroform, tincture of capsicum, spirits of camphor, compound spirits of lavender, and so forth.

Accessory Treatment.—In cases of diarrhœa, where the tongue is white and coated, the pulse accelerated, the temperature a little raised, and some pain or soreness, increased by pressure, is felt in the abdomen, small doses of epsom or Glauber's salts, in conjunction with hyoscyamus and opium, and perfect rest in bed with the most rigid attention to diet, are necessary, lest the slight irritation of the mucous lining of the alimentary canal become aggravated into actual inflammation, and more serious disease, such as dysentery, enteritis or obstinate chronic diarrhœa result.

Diet.—The diet of a person suffering from diarrhœa must be very strictly regulated, and, in fact, nothing but tapioca, sago, boiled rice or milk-toast with boiled milk, twice-boiled water, beef-tea and table-tea should, as a rule, be put into the stomach. Even after the malady seems to be cured, much caution must be exercised about returning to the or-

dinary diet. This disease, like most others, indeed, exhibits as it passes away a singular analogy to a conflagration, which for days after it has apparently been extinguished is ready to break out again, if the remaining sparks happen to be fanned into a flame by the wind or any new fuel is supplied.

CONSTIPATION OR COSTIVENESS.

Definition.—This diseased condition, the direct opposite of the preceding one, may be defined as a retention of the fecal matters beyond the usual period, so that they are passed with difficulty and in a comparatively hardened state.

Causes.—The causes of constipation are almost infinitely various. Every form of impaired digestion may originate it; the existence of piles or hemorrhoids, a sedentary life, application to study, amenorrhea and uterine disease in females, all are apt to induce it, and almost every acute disease is frequently ushered in by constipation. It is more often met with among women than men, probably because the female sex fail to exercise sufficiently in the open air; and many articles of food largely contribute to establish the evil of habitual constipation.

Treatment of the Acute Form.—If the trouble be occasional and accidental, any of the milder laxatives, such as a tablespoonful of epsom or Glauber's salts, rochelle salts, castor-oil—which is the safest purgative, as a rule—ten or fifteen grains of rhubarb, senna, or the various purgative mineral waters may be employed. For some patients, injections of warm water, or soap and water, answer a very good purpose, and if administered with care are perfectly harmless.

Treatment of the Habitual Form.—Habitual constipation is best treated by the regulation of the diet, partaking of fresh or stewed fruits, bran bread and vegetables in season, in proportions sufficient to antagonize the torpor of the bowels; at the same time resorting to active exercise in the open air, and endeavoring to correct any faulty habit of life, which may be the primary cause of the trouble. If the difficulty had its origin in hereditary tendency, or other deep-seated modification of the organism, laxatives should be resorted to, because, in the writer's opinion, at least, the evils of constipation are far greater than those arising from the constant employment of these medicines.

Additional Treatment.—It is probable that for most persons saline laxatives, such as rochelle salts, or purgative waters during the summer, and in cold weather pills of a grain of rhubarb, one-sixth of a grain of

podophyllin and a grain of compound extract of colocynth, teaspoonful doses of the compound liquorice powder, or fld. extract of cascara sagrada daily will be beneficial. This acts as a tonic to the muscular coat of the bowels.

Relieving Constipation.—Obstinate constipation—that is, absence of evacuation for several days, or a week or two—is a dangerous condition, and should never be permitted to occur, since the large and densely-packed masses of feces may require the operation of drastic cathartics to dislodge them, and such medicines, in accomplishing their work, sometimes set up serious or fatal inflammation. Liberal potations of castor-oil, aided by large enemas, may first be tried in such a case; then senna, in teaspoonful doses of the fluid extract; then quarter or half-grain doses of tartar emetic, in conjunction with epsom salts, and if these fail, it may be necessary, under skillful advice of a physician, to resort to drastic cathartics, such as gamboge, calomel, elaterium and croton oil, provided no organic obstruction exists.

HERNIA OR RUPTURE.

Definition.—Hernia is the name usually applied to the protrusion of some portion of the bowel or any abdominal viscera through the wall of the abdomen.

Varieties.—We may have umbilical hernia or protrusion of the bowel at the navel, a form often seen in children; and hernia in the groin or inguinal hernia, which is probably a most common variety. It has been estimated that about one man in every seven is affected with hernia, but in most cases the intestine is kept in its place more or less perfectly by some form of truss. When a hernia can be pushed back it is called reducible. An irreducible hernia cannot be returned into the cavity of the abdomen, and is constantly in danger of being inflamed, by some accidental blow for instance, and so becoming strangulated.

Causes.—Hernia is sometimes produced or driven out under some treacherous truss, which should protect against such an accident, by very slight causes, all of which should be carefully guarded against by those who have any hereditary tendency to this disease. It may be forced out by a jerk, such as suddenly pulling open a door that sticks, or by a fall, by an attempt to lift a heavy weight or to raise a moderate one whilst in a constrained position, or any other act which tends to bring a strain upon the bowels, making them bear downward. It is also favored in its occurrence by overeating, by excessively exhausting exertion, and by

severe effort at times when the body is enfeebled by disease. It is more common on the right than on the left side of the body.

Symptoms.—The symptoms of strangulated hernia are intense pain, not only in the neighborhood of the rupture but over the whole abdomen and especially around the navel, obstinate vomiting, and cessation of the passages from the bowels. At first there may be one or two evacuations of the fecal matters already below the seat of strangulation, but after that is cleared out the bowels cease to move, and if the strangulation is unrelieved the vomiting, which persists in spite of all remedies, results in bringing up fecal material through the throat. This is a very curious phenomenon, and seems to indicate that nature in her stupid zeal to get rid of digested materials, on finding that the usual avenue downward is blocked, soon reverses the normal peristaltic movement and tries to evacuate the bowels through the mouth. In accordance with this idea the importance of such stercoraceous vomiting, as it is called, in the diagnosis of strangulation of a hernia, or some similar obstruction, is very great.

Treatment of Strangulated Hernia.—When fecal vomiting occurs, if undecided before, not a moment should be lost in sending for the best medical skill which can be procured, and which even then may arrive too late. In the absence of medical assistance, reduction of an obstinate hernia on the point of becoming strangulated, or perhaps already compressed, may sometimes be accomplished by putting the patient in a warm bath, and so relaxing the system as already explained; or a full dose of opium or morphia, the former preferably by enema, may perhaps have the desired effect; or lastly, the administration of ether or chloroform, by one who is accustomed to giving these anesthetics, by still more fully relaxing the system, may happily allow the endangered fold of the intestine to be pushed back into its proper place. If the hernia cannot be reduced an operation is absolutely necessary and is attended with but very little risk in the hands of a skilled surgeon.

Treatment of Reducible Hernia.—In this form of hernia the contents of the sac can be reduced into the abdominal cavity. The treatment may be palliative or radical.

Palliative Treatment.—Prevent constipation, avoid sudden strains and violent exercise and order a truss. The continual employment of a truss, especially in young persons, may bring about a cure. The day truss should be applied before rising in the morning and be removed after lying down at night, when a light truss may be substituted. A truss is always uncomfortable at first, but a person soon grows used to it. It should be

kept perfectly clean, and it is well to dust borated talc powder upon the skin under the pad at least once a day. A truss which does not keep the hernia up increases pain and does harm. Too strong a spring tends to enlarge the hernial opening and thus aggravates the cause.

Radical Treatment.—This is operative and the sac is completely closed and a new canal formed. These operations show a very small percentage of recurrences.

INTESTINAL WORMS.

The intestinal canal is often the home of parasites, commonly called worms, and in many parts of the country nearly all children between the ages of one and seven years, as well as many older persons, are troubled with these pests.

Varieties.—1. In childhood the usual inhabitant of the bowels is the round-worm or ascaris lumbricoides, a creature attaining the size of a large earth-worm, which it resembles in appearance, except that it is whitish or brownish, and stiffer and harder in its structure.

2. Children are also often infested with the oxyuris, commonly called the thread-worm, pin-worm, or seat-worm. This parasite is sometimes found in great numbers about and just within the fundament. In size they are very nearly that of a very small pin or piece of thread about half an inch long, but by their number and activity they often contrive to prove very troublesome guests to their unwilling host.

3. The third common parasite which preys upon the human species is the tænia solium or tape-worm, of which some account has already been given. These parasites are always introduced into the system from outside, either with food or drink, and hence one great reason for the good cooking so strenuously urged in a former chapter. They are a great source of irritation as long as they remain, and in childhood, by the reflex irritation their movements in the intestines are capable of exciting, constitute one of the common causes of convulsions. Exactly what articles of food convey the eggs of the round-worms and the pin-worms into the human system has not yet been discovered, but the tape-worm is known to find its entrance into our bodies by the eating of raw meat, generally beef or pork.

Symptoms of Round-Worms.—The symptoms are often absent. When present there are usually symptoms of dyspepsia, diarrhœa, with mucous stools, colicky pains in abdomen, voracious appetite which it is almost impossible to satisfy. There is anemia and often reflex nervous phenom-

ena such as "night terrors," grinding of the teeth, itching of the nose and anus, twitching of the face and limbs and there may be convulsions.

Treatment.—The diet should be restricted before the remedy is administered. The most effective remedy is santonin, which is best given with calomel, as in the following:

R.—Santonin ..... 5 grains
Calomel ..... 5 grains
Sugar ..... 20 grains
Divide into ten powders, and take one powder morning and evening.

Fluid extract of spigelia, one to three fluid drachms, often proves very effective.

Symptoms of Pin-Worms.—These chiefly affect the lower colon and rectum, and produce severe itching of the anus and adjacent parts.

Treatment.—Flush out the bowel with water, then inject infusion of quassia chips two or three drachms to the pint of water.

Symptoms of Tape-Worm.—These are frequently absent. There may be dyspeptic symptoms, colicky pains in abdomen, loss of flesh, capricious appetite and at times reflex nervous phenomena as vertigo, palpitation, "night terrors," convulsions, itching at nose and twitchings of limbs and face, especially the latter.

Treatment.—A light diet for a day or two previous to the administration of the remedy, so that the worms will be hungry enough to feed upon the drugs administered. After an unsubstantial breakfast administer one of the following efficient remedies: Pumpkin seeds, two to three ounces, oleoresin of aspidium, one to two drachms; pomegranate, one drachm.

Auxiliary Treatment.—Before giving any of these the bowels should be thoroughly emptied by a good purge, and about twelve hours after the administration of the remedy another purge, preferably castor oil, should be given. The treatment is successful only when the head is passed, so the stools must be watched carefully. If not successful the first time try again in a day or two.

COLIC.

Colic is an acute spasmodic affection of the bowels without diarrhœa or much fever, but attended with severe cramps of the abdominal muscles.

Causes.—Its most common causes are indigestible food, reflex irritation from the uterine or ovarian disease, and lead poisoning.

Symptoms.—The great characteristics of colic are the griping, twisting pains, radiating from the navel and relieved by pressure. Care must be taken not to mistake these pains for those of strangulated hernia, or the converse, which would be a much more serious blunder.

Treatment.—The treatment is to relax the spasm by opiates, and remove the offending material if there is any in the bowels. For the former purpose twenty or thirty drops of laudanum by enema or hypodermics of one-eighth of a grain of morphia, and for the latter a tablespoonful of castor oil or a Seidlitz powder answer very well in most instances.

HEMORRHOIDS OR PILES.

Hemorrhoids or piles are exceedingly common and troublesome complaints, consisting of little tumors which form at the edge or just inside the fundament, and give rise to intense suffering, especially when the bowels are evacuated.

Varieties.—There are three varieties: external, internal and mixed.

Causes.—Their production is favored by constipation, sedentary habits, hard seats, and some forms of liver complaint.

Symptoms.—The inflammatory enlargement is detected and is tender and inflamed. Pain on evacuation of bowels. The external variety does not bleed. Very often their surface, which in the internal variety is composed of the distended mucous membrane, exudes blood, in which case they are called bleeding piles. When seated outside the margin of the fundament they are not so apt to bleed, and receive the name of blind piles.

Treatment.—They may generally be prevented from developing by proper attention to the bowels, non-stimulating diet and rest, and, whilst small, an ointment of ten grains of extract of belladonna, thirty grains of tannin, and twenty grains of powdered opium in an ounce of simple ointment, will usually relieve them.

Auxiliary Treatment.—Injections of cold water into the rectum, bathing the parts with cold water after each bowel movement, or an ointment of

Chrysarobin	15 grains
Iodoform	5 grains
Extract belladonna	10 grains
Vaseline	4 drachms

Apply three times a day.

Apply this night and morning after carefully cleansing the part. Extract of hamamelis is a valuable application for external piles. When the

acute symptoms subside use lead water and laudanum. If the internal piles prolapse and inflame use, in addition to the above, Allinghour's ointment on the parts. If the piles are protruding and reduction cannot be affected put the patient to bed, give a hypodermic of morphine sulphate one-fourth grain and apply hot poultices.

Surgical Treatment.—If hemorrhoids do not yield to the above treatment surgical operation is necessary, which is accompanied with very little danger. It may be done under local anesthesia, but general anesthesia enables an operator to accomplish his task with more thoroughness.

FISTULA IN ANO.

Causes.—Fistula in ano is a very painful disease, in which a communication at the side of the fundament is opened through the flesh into the rectum, or lower bowel, above the sphincter or muscle which ordinarily keeps it closed. It is usually the result of an abscess at the side of the intestine. There are several varieties of fistula, in the worst of which the fecal matters from the intestines constantly leak out through the hole or sinus, and besides causing great irritation and pain, render the sufferer disgusting to every one whom he approaches. Most of these different forms of fistula can, however, be cured by severe surgical operations.

Fissure of the Anus.—This is another painful affection, in which a slit or crack appears in the side of the fundament, often the result of a small ulcer at the edge of the opening. As it must be torn apart every time the bowels move it is very difficult to heal. Sometimes fissure of this kind can be cured by touching the sore with caustic, and using laudanum injections to keep the intestine in a state of comparative rest, but if these fail a surgical operation is the only remedy.

Prolapsus Ani, called also falling of the bowel, is the coming down of the rectum, which protrudes outside of the body sometimes to the distance of three or four inches. It generally results from constipation, and is especially apt to occur in weakly and neglected children. The protruding portion of the intestine should be carefully and gently pushed back to its place with the fingers covered with a well-oiled silk handkerchief, and suitable apparatus obtained from the instrument makers to keep it in position. Sometimes an operation is necessary.

DISEASES OF THE LIVER

JAUNDICE.

Jaundice is rather a symptom of disease than a separate malady.

Causes.—It may be due to a suppression of the secretion of bile by the hepatic cells; or, again, by an over-activity of these elements, and a superabundant supply of bile in the system; or, thirdly, by obstruction to the outflow of bile, and reabsorption of its elements into the blood.

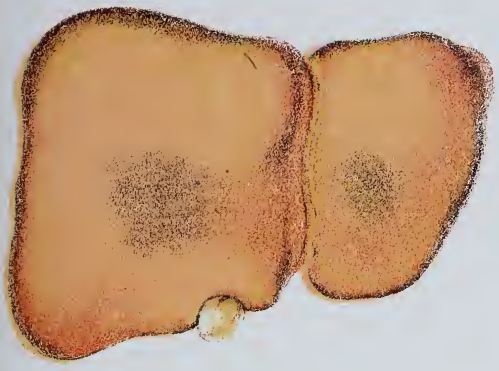
Symptoms.—It consists of a morbid yellowness of the skin, the white of the eye and other parts; but in bad cases this yellowness may become so intense as to appear olive-green, brown or even black. The urine is also of a yellow or saffron color, but the discharges from the bowels are pale and devoid of the natural brownish-yellow tint, sometimes having the bluish-white of potter's clay. Troublesome itching of the skin, slow pulse, low temperature, debility and a tendency to hemorrhage from the mucous membranes are frequent in jaundice.

Diagnosis.—The most important practical point is to determine whether the gall-ducts are obstructed or not. If they are closed, so that the stools contain no bile, the jaundice speedily becomes intense and the swollen gall-bladder can sometimes be felt below the edge of the ribs. When not obstructed, the reverse is the case. Jaundice which comes on suddenly is probably due either to a gall-stone or to nervous disturbance. Intense jaundice which has developed very gradually probably results from pressure outside of the gall-duct, such as would be produced by a tumor or cancer.

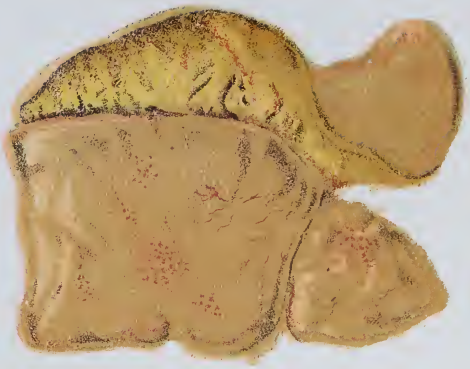
Gall-Stones.—Intermittent attacks of jaundice point to gall-stones in old people, and to catarrh of the bile-ducts in children. Paroxysmal pain preceding jaundice points to gall-stones; following jaundice, to cancer of the liver. Jaundice with great enlargement of the liver, if the latter is painful and tender on pressure, indicates cancer; if painless, it suggests the waxy or lardaceous condition of the liver. When jaundice accompanies ascites, it is usually due either to cancer or cirrhosis. The danger of life from jaundice, unless it does indicate some fatal disease like cancer or cirrhosis, is small; but in its severer forms it is often very obstinate, lasting for weeks or months.

Treatment.—The treatment consists of small doses of calomel or blue

LIVER COMPLAINT.



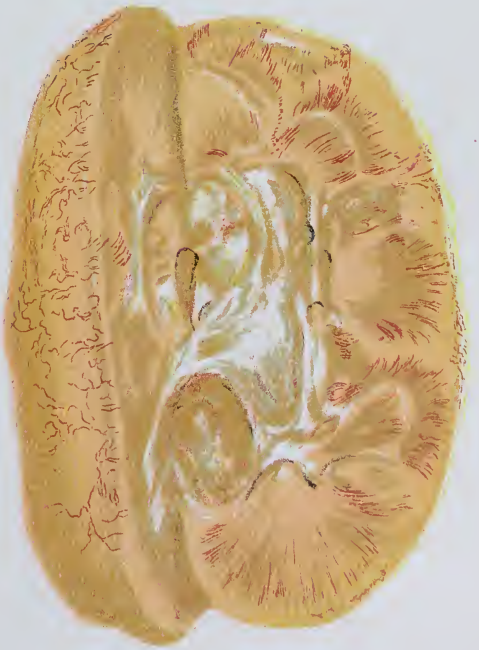
Normal or healthy liver



Diseased liver

KIDNEY DISEASE.

Healthy kidney



Bright's disease

pill followed by a saline purge for a few days, avoiding salivation. The mercurial medicine may be substituted or aided by five grains of extract of taraxacum; podophyllin and leptandrin, in quarter-grain doses, and bicarbonate of soda in quantities of ten grains. Later on in the attack, five-drop doses of diluted nitro-muriatic acid may be administered with advantage, leaving a few days' interval between the last dose of any mercurial and the acid remedy. The phosphate of soda is also useful.

Jaundice of Infancy.—It is very common to observe jaundice commence in the first or second day after birth. Usually of no importance. Probably due to diminished pressure in the portal system or to poteut ductus arteriosus. Recovery takes place in a few days or weeks. The severe forms may depend on septic poisoning with inflammation of the umbilical vein, congenital inflammation of the liver due to syphilis or congenital absence of the hepatic duct.

CONGESTION OF THE LIVER.

Causes.—Acute congestion of the liver may result from cold, from over-eating, or from the abuse of alcohol.

Symptoms.—Its symptoms are enlargement of the organ with tenderness on pressure, and a feeling of painful tension on the right side just above the edge of the ribs, often radiating to the right shoulder, slight jaundice, furred tongue, loss of appetite and scanty, high-colored urine are present, and the whole group of symptoms constitues the condition commonly designated as "being bilious."

Treatment.—It is generally relieved by a small blue pill, or small doses of calomel followed by a saline purgative, and attention to diet for a few days. If neglected this form may run on to chronic congestion or lay the foundation of inflammation of the liver.

ABSCESS OF THE LIVER.

Abscess of the liver is the formation of pus in the substance of the organ. There may be one large abscess cavity or many small ones.

Causes.—1. It may be due to injury.

2. The presence in the liver of the amvela culi of dysentery.

3. Foreign bodies, gall-stones and retained bile.

4. Septic emboli which may come through the hepatic artery but usually through the portal vein from other diseased viscera and produce a purulent inflammation of the vein.

Symptoms.—The fever is of the hectic variety, high in the evening and low in the morning. Chills are sometimes present; pain is variable and may be felt in back of right shoulder. The liver is enlarged, painful and tender. Marked jaundice is rare. There may be bulging, and fluctuation is sometimes detected.

Treatment.—There is only one treatment, which is surgical.

Degenerations of the Liver.—Acute atrophy of the liver, waxy liver, and fibroid deposit in the liver are various forms of degeneration for which little can be done by medical treatment and which are fortunately rare. Not so, however, as far as regards infrequency, with cirrhosis of the liver, called also drunkard's liver and hŏb-nail liver, because of its origin in the abuse of alcohol and the peculiar contracted form which it presents. The process which the liver undergoes is a condensation of the substance and destruction of the secreting cells, with thickening of the connective tissue. The whole liver gradually contracts, ceases in great measure to manufacture bile and, becoming an obstruction to the venous circulation, produces ascites or abdominal dropsy, under which the sufferer generally succumbs.

LIVER OR HEPATIC COLIC (GALL-STONES).

Gall-stones are hard concretions which form within the gall-bladder, and when they attempt to pass out through the gall-duct often give rise to the most excruciating agony which the human being is capable of suffering.

Symptoms.—This pain is called hepatic colic, on account of its griping, tearing character, and may generally be distinguished by its coming on and passing off suddenly; by its frightful intensity; by being deep-seated instead of superficial; by being accompanied with vomiting and by the pulse being rapid and feeble. The onset may be marked by a chill and fever. It may last from a few moments to several days, and is often so severe that strong men will sometimes writhe and roll around on the floor, screaming in their agony. It seldom comes on before middle life, and women are much more frequently attacked than men. The pain is chiefly in the upper part of the abdomen on the right side. If a gall-stone remains in the duct for more than twelve hours, it is usually followed by jaundice coming on two or three days later. The affection terminates either by the stone slipping back into the gall-bladder or passing out through the duct into the bowel, in which latter event it may be found

in the evacuations during the next week, and should always be searched for. The stone usually varies in size from that of a small shot to an inch or more in diameter, and in color from yellowish-white to dark-brown. If single, it is usually oval or rounded; but if two or more have been formed, the first one is marked by impressions of the others, and thus the prospect of future attacks can be estimated. Notwithstanding the alarming suffering the danger to life is small, and death rarely eventuates from hepatic colic.

Treatment.—The treatment is by thirty-drop laudanum enemas or hypodermic injections of a quarter of a grain of morphia and one-one-hundredth of a grain of atropia, with chloroform or ether by inhalation, if the pain is unendurable. Hot fomentations, or hot baths, sometimes afford partial relief. In order to prevent the recurrence of hepatic colic, small doses of carbonate of soda, alkaline mineral waters, or a mixture of chloroform and turpentine have been highly recommended.

Value of X-Ray.—The use of the X-ray was found valuable in the diagnosis of gall-stones.

ASCITES OR DROPSY OF THE ABDOMINAL CAVITY.

Symptoms.—The prominent symptom of ascites is the distension of the abdomen, which sometimes becomes enormously swollen, and by the pressure upward of the diaphragm gives rise to distressing dyspnœa.

Treatment.—When possible endeavor to remove the cause. Purge freely with concentrated salines, compound jalap powder twenty to thirty grains, elaterium one-eighth grain. Increase the action of the kidneys by infusion of digitalis two drachms, citrate of caffeine three to five grains, diuretin fifteen to thirty grains.

Auxiliary Treatment.—If the effusion is large and does not yield to the above treatment tapping is indicated, which is a procedure accompanied by very little danger. No anesthetic is required, and it gives almost immediate relief to the dyspnœa. Care must be taken not to draw off the fluid too rapidly, as this might cause collapse.

LIVER COMPLAINT.

Causes.—A congested state of the liver which may depend on an obstruction in the portal and hepatic venous system, in which there is a deficiency of tone in the veins which prevents the normal ascent of the blood from the lower parts of the body, thereby distending the vessels and causing an accumulation of blood. This inability of the blood to ascend against gravity is found in a great variety of chronic diseases. A very frequent cause of disease of the liver is the indulgence in alcoholic stimulants and the eating of too highly seasoned food.

Symptoms.—1. Perhaps there is no disease in the whole human frame in which symptoms assist less. In some of the more acute forms of the disease the symptoms are urgent, but except in a few instances they convey little or no information with respect to the nature or progress of the disease, and in the more chronic forms irreparable mischief is often established before the patient even suspects that there is anything wrong. There are, however, certain general symptoms which, when present, enable us to pronounce pretty positively as to the existence of liver disease, though they will not assist in determining its nature. These are dropsy, indigestion and jaundice. The tongue is generally coated and commonly furred. A disagreeable, bitterish taste is felt in the mouth, and eructations take place, sometimes bitter, cutting, acrid and even excoriating the lining of the throat. The skin may be hot and dry-parched and rough, or it may be too relaxed, giving rise to cold, clammy sweats.

2. There is no excretion, not even excepting the bowel evacuations, which is more frequently deranged in diseases of the liver than urine. Thus, bile may be detected in the urine when no other irregularity is present by the application of muriatic acid.

3. Not unfrequently a patient has lost the power of assimilation, not from any well defined organic lesion of the liver or alimentary canal, but rather because of a stagnation of want of proper secretion through the ducts of the liver. When these become deficient in secretion the healthy action of the liver is arrested and various disorders immediately begin to be manifested. The bowels do not move freely; the bile, instead of getting excreted by the intestines, is taken up by the blood. In consequence the internal organs suffer and a bilious attack follows. After frequent attacks the skin becomes sallow, rough and yellowish, and you are affected with headache, constipated bowels, coated tongue, pain in the right shoulder and side from the poison left behind in the blood. Here is the first seat-origin of pulmonary consumption.

4. The so-called biliousness, indigestion, capricious appetite, pain after food, eructations, acidity, flatulence, irregularity in the bowels, whether as constipation or diarrhœa, point almost always to this disturbance, and it is a most potent factor in causing and inviting other diseases.

5. The modern liver is a degenerate organ; the average digestion far below the standard of old, and its function abnormally feeble and slow. Gout and uric acid congeries prevail to a remarkable extent, and the ailments, directly or indirectly attributable to malnutrition, meet the busy practitioner at every turn, The bilious attack of olden time, for which mercury was a specific, and that of to-day are alike. The former was almost always the invariable penalty of a "surfeit," brought on by inordinate indulgence in the pleasures of the table, in an age when the "three-bottle man" was a hero of every convivial gathering, and the appetite on the morning following a "night out" usually unequal to the most exacting demands of a bountifully-spread board, without the aid of the seductive but dyspepsia-breeding cocktail. The latter-day biliousness, on the other hand, comes on insidiously, often without apparent cause, and follows the most trifling indiscretion in diet. The digestive organs being weak to begin with, a slight excess of intestinal decomposition is easily provoked, and the whole system becomes gradually saturated with its poisonous products. This condition, therefore, is not amenable to the mercury treatment.

Treatment.—1. The successful treatment of the modern form of the disorder is but just begun when all putrescent elements of ingested food have been carried off by purgation. The condition remaining, in which there are large amounts of slowly accumulated deposits in the system which the unaided efforts of nature are impotent to remove.

A pill composed of aloin, may-apple and nux vomica, an eighth of a grain of each, may be taken at night, or night and morning, until the bowels become regular. By their judicious use the digestion will be improved, also the general health, thereby avoiding those principal sequences which attend the constipated condition.

2. Medicines should be "arms of precision." The physician cannot push his remedies to the limit of safety unless he has perfect confidence in their purity and accuracy. This combination accomplishes this in a threefold manner. The may-apple increases the healthy action and secretion in the ducts of the liver. The nux vomica, by its stimulating and tonic effect on the stomach, enables it to better assimilate and digest the food; while the aloin completely cleanses the walls of the alimentary canal.

Through their combined action the system is restored to its normal standard. This is the secret of their curative power in the treatment of liver disease. This secret is one of immense power. They not only stimulate the brain by their action in generating more gray matter, but in some mysterious manner vivify the great sympathetic nerve which covers the bowels and energizes the eighth pair of nerves which supplies the liver. They speedily affect the liver, restore the gland to its pristine activity, and the bowels become regular, the complexion clear, the breath sweet and the whole body seems rejuvenated, proving that the liver has renewed its normal function.

When the bowels do not move freely the liver becomes congested, and the bile, instead of being excreted by the intestines, is taken up by the blood. In consequence the internal organs suffer and a bilious attack follows. After frequent attacks the skin becomes sallow, rough and yellowish, and you are troubled with headache, constipated bowels, coated tongue, pains in side, and your whole system feels out of sorts. For this condition take three pills on retiring at night.

For an aggravated attack of biliousness or chronic liver disease take one pill three times a day for one week. Take one pill each night at bedtime for two weeks, after which take one pill twice a week for about three weeks.

For a slight attack of biliousness, indigestion, and so forth, take two pills on retiring and one pill each night afterward until five have been taken.

Auxiliary Treatment.—When suffering from this disease the diet should first be considered. Light gruel or toast water and buttermilk or skimmed milk can be taken. Light mutton or chicken broth, after removing the greasy portion from the top. Food should not be eaten between meals, of any kind. Alcohol or malt liquors, as also tobacco, are to be avoided. For the relief of pain in the side over region of liver apply a hot hop poultice, or, what is preferable, a hot-water bag should be placed over this region and replenished so as to keep up constant heat. In severe cases the tension may be relaxed by a mustard plaster or an application of spirits of turpentine well rubbed in. This acts as a counter-irritant and often gives speedy relief. If the patient continues to vomit, a little lime-water and milk—a teaspoonful of lime-water in a cup of milk—or a mustard plaster made with the white of egg and applied to pit of stomach will frequently give immediate relief. Regarding diet, it should bland and unirritating.

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CURATIVE MEDICINE

PART VIII.

DISEASES OF THE URINARY SYSTEM

The Urinary Organs.—The important group of organs which makes up this system comprises the kidneys, two glandular bodies about four inches long, and of the peculiar shape of a kidney-bean, with their outlet pipes communicating with the bladder, and its exit tube the urethra, opening in both sexes in conjunction with the organs of generation.

Office of the Kidneys.—The office of the kidneys in the animal economy is to secrete the urine which passes from each gland down its separate ureter into the bladder, where it may be stored to the amount of half a pint or a pint, and from which it ought, at suitable intervals of from four to six hours, to be evacuated. The ingredients of the urine being waste material, poisonous to the organism if retained in the blood, it will readily be understood why the suppression of the renal secretion, in certain morbid conditions, or its retention in consequence of any obstruction to its outflow, in the narrow ureters or urethra, may give rise to some of the most horribly painful and fatal diseases which mankind is ever called upon to endure.

Function of the Kidneys.—The function of the kidneys is purely an eliminative one, and a full understanding of its performance could only be gained by a study of the intricate structure of the organs, too complex to be considered here. It is sufficient for the present purpose to state, that the blood entering each kidney by its large renal artery is purified by having removed from it the elements of a poisonous substance, urea, with uric or lithic acid, phosphoric acid, and sulphuric acid, variously combined with potash, soda, lime, magnesia, and probably other refuse matters in smaller amounts. These solid ingredients of the urine are dissolved in the forty or fifty ounces of water which is also during health

taken out of the blood by the kidneys, and in this way the urine is manufactured. The purified blood, after giving up these deleterious matters in the renal organs, is returned to the general circulation by the renal veins.

Passage of Urine.—In perfect health a man of average size would pass in the forty-eight ounces of urine, which he should daily evacuate from his bladder, an ounce and one-third of urea, nearly an ounce of chlorides, sulphates and phosphates, and from eight to twelve grains of uric acid. If, for any reason, the amount of water filtered out of the blood is less than this, there is danger that some solid constituents of the urine may crystallize within the urine or bladder, and being, perhaps, washed into the ureters in the one case, or into the urethra in the other, block up these outlets and give rise to the horrible agony of nephritic colic, gravel or stone in the bladder; or, again, even slight inflammation in these small tubes may result in a contraction or stricture, which hinders the passage of the urine, and also causes great suffering to the unfortunate patient.

Guide to Kidney Disease.—The chief guide to diseases of the kidneys is, necessarily, therefore, a chemical and microscopical examination of the urine, with the sediments which fall from it, in each individual case, and this should never be neglected in any but the most temporary and insignificant derangements of the urinary apparatus.

ACUTE NEPHRITIS OR ACUTE BRIGHT'S DISEASE.

Nature of the Disease.—Acute Bright's disease, called also acute nephritis, is a malady in which the kidney becomes greatly enlarged and vascular, with its minute convoluted tubes, in which the urine is primarily manufactured, plugged up with epithelial cells. These epithelial cells in the form of casts of the renal tubules are voided in the urine together with albumen, and sometimes with blood. The obstruction to the outflow of the urine and the interference with the function of the kidney give rise to the most serious general symptoms.

Causes.—Acute Bright's disease is a rather common complication of scarlet fever, and is one of the dangers most to be dreaded in that malady. It also occurs in cholera, yellow fever, scarlet fever, erysipelas and diphtheria, and may be produced by alcoholic intemperance, or by exposure to cold and wet, particularly by sitting on a wet or cold object, such as a stone step. Certain poisons which are eliminated through the kidneys, as

cantharides and turpentine. Pregnancy is also a potent factor in the cause of the disease.

Symptoms.—The symptoms are, first, in many cases, chilliness, followed by fever, some pain in the loins and across the lower part of the spine, scanty high-colored and albuminous urine, and in a day or two dropsy, or watery effusion under the skin, beginning beneath the lower eyelids or in the organs of generation, but soon becoming general over the whole body. Uremic coma may develop at any time.

The Urine.—Scanty always, and at times entirely suppressed. Smoky in appearance, high specific gravity, rich in albumen and throws down a heavy sediment, which, when examined microscopically, will be found to contain hyaline, blood and epithelial casts, and free blood and epithelium.

Treatment.—The treatment, which is successful in a majority of the cases, consists in keeping the patient in bed in a room with a warm, moist and equable temperature, purging gently with those laxatives which cause watery discharges from the bowels, such as small doses of five grains of jalap and thirty grains of cream of tartar, promoting free perspiration by the use of sweat baths, which are given by placing the patient in a tub of water at the temperature of 106 degrees Fahrenheit for twenty minutes. Give a thorough rub and place in bed between blankets with hot water bottles, or hot cans around, but not touching the patient. A blanket should be interposed between the skin and the hot cans. Allow free perspiration for an hour to an hour and a half. Sweating may be aided by giving from one-twelfth grain to one-eighth grain of pilocarpine. Guard against collapse by giving strychnine sulph., one-twentieth grain. Dry cups followed by hot fomentations over loins. In bad cases, with robust patients, cut-cups or leeches may be used in place of the dry cups, and acetate or citrate of potash in twenty-grain doses, with ten drops of tincture of digitalis or squills, and half a teaspoonful of sweet spirits of nitre are often given with benefit. Citrate of caffeine in one to two grain doses may be tried. Infusion of digitalis in one drachm doses is especially beneficial in children. Diuretin in from ten to twenty grains three times a day for adults, and two to five grains for children will often give good results. Bascham's mixture, two drachms thrice daily. Niemeyer recommends a pill if œdema is present, composed of blue mass, powdered digitalis, powdered squill, each of one grain. Take one of these thrice daily. The following combination may prove efficient in troublesome dropsy:

Spartine sulph.	4 grains
Caffeine citrate	20 grains
Lithia benzoate	40 grains

Divide into ten powders, and take one every three hours.

CHRONIC BRIGHT'S DISEASE OR CHRONIC NEPHRITIS.

Causes.—It may follow the acute, or may be chronic from the beginning. Males are most frequently attacked. Adult life, frequent exposure to wet and cold, alcoholism and congestion from heart disease and syphilis are the chief predisposing causes.

Symptoms.—The symptoms of well-defined chronic Bright's disease are albuminous urine, containing renal epithelial cells and tube-casts, more or less dropsical effusion, especially noticeable about the face and ankles, anemia, shortness of breath, a peculiar dryness of the skin, dyspepsia, headache and giddiness, together with a tendency to dimness of sight and inflammation of the retina of the eye, uremia or blood-poisoning from the retention of the urea, which ought to be removed by the kidneys in the circulating fluid, secondary inflammations, such as pneumonia and pericarditis and hypertrophy of the heart. Its presence can only be positively ascertained by thorough microscopical examination of the urine, and such examinations repeated from time to time are the best guides as to the necessary treatment. The variety is essentially chronic, running a course of months or years, with a tendency to temporary improvement under treatment, on the one hand, and to subacute exacerbations in consequence of unhygienic imprudences on the other. It almost always proves fatal in the end, however, by uremia with or without convulsions, by secondary inflammations, or perhaps by general debility. It is estimated that uremia causes death in about one-third the cases.

Treatment.—The treatment for chronic albuminuria is in the main hygienic. Residence in a warm and equable climate. A quiet life without mental worry, with gentle but not excessive exercise, is recommended. In addition the bowels should be kept regular, skin active by daily tepid bath with friction. Abundant pure water or some pleasant mineral water should be drunk. The underclothing should be wool or silk, and the diet non-nitrogenous, and in severe cases absolute diet of skimmed milk will prove beneficial, unless dropsy or symptoms of uremia require active remedies.

Further Treatment.—Should the former be very troublesome, and diuretics, as suggested when speaking of the acute form, fail to act, as

frequently happens, recourse must be had to the hydrogogue cathartics, such as a quarter of a grain of elaterium, already spoken of, with hot-air or vapor baths to promote elimination by the skin, as a partial substitute for the inefficient work of the crippled kidneys. If marked symptoms of uremia appear, such as headache, drowsiness, involuntary muscular twitchings, sudden and violent vomiting and diarrhœa, recourse to the active cathartics should be had at once, without any preliminary trial of a diuretic, and if uremic convulsions or coma come on, full doses of elaterium or a drop of croton oil will probably be required immediately to avert death. During the convulsion chloroform may be given by inhalation to restrain the violence, and perhaps shorten the paroxysm.

Many cases of uremia are benefited and life prolonged by blood letting of from six to twelve ounces, depending upon the pulse, and followed by an injection of saline solution from one to two pints beneath the breasts, or in subcutaneous structures of the axilla, strength of solution about one teaspoonful of salt to a pint of distilled water, to be injected at about the temperature of 100 degrees Fahrenheit. Care must be taken to thoroughly cleanse the skin at the point at which the needle is to be inserted. Early in the case Bascham's mixture does good.

HEMATURIA OR BLOODY URINE.

This is more a symptom of other diseases than a disease in itself.

Causes.—Stevens gives as the causes thus:

1. Vicarious menstruation.
2. Traumatism applied to any part of the genito-urinary tract.
3. General blood dyscrasia as in specific fevers, purpura, malaria, scurvy, etc.
4. Congestion of the kidney from chronic heart, lung or liver disease.
5. Acute inflammation of any part of the genito-urinary tract.
6. Stone in any part of the genito-urinary tract.
7. Varicose veins in neck of bladder.
8. It may occur without obvious cause.
9. Parasites in genito-urinary tract.
10. Tumors and tubercle of the kidney.

The presence of blood may be suspected from the red, smoky or brownish color of the urine, and positively determined by a microscopical examination. If the blood is clotted it generally comes from the bladder, and if coagulated in long round strings, like earth-worms, it may have been

effused in the urethra, from a rupture or ulcer in that membranous tube.

Treatment.—The most important thing is to discover the cause and treat that. If this cannot be done tincture of chloride of iron, which is especially useful in debilitated patients in twenty-drop doses every three hours, gallic acid in quantities of five grains, and ergot, or two grains of acetate of lead and half a grain of opium every four hours. The effect of the general remedies may be aided by the injection of a weak solution of alum in cold water, thrown into the bladder by means of a catheter if the case is urgent. Where a large mass of coagulated blood is formed in the bladder it may sometimes be gotten rid of by the injection of a solution of pepsin, which, if the ingenious plan succeeds, dissolves the clot of blood.

PYURIA OR PUS IN THE URINE.

Causes.—1. Suppurative inflammation of the kidney.

2. Calculus (stone) or tuberculosis of kidney.

3. Cystitis or suppurative inflammation of the bladder.

4. Urethritis. Inflammation of urethra.

Symptoms.—Urine is alkaline and has a cloudy sediment. There is usually frequent and urgent desire to urinate, especially if the pus is from the bladder or posterior urethra.

Diagnosis.—Diagnosis can only positively be made from microscopical examination. If from abscess of kidney flow of pus is intermittent. If from calculus or tuberculosis of kidney the flow is constant, as it is in cystitis or urethritis.

Treatment.—The treatment consists in removing the cause.

SUPPRESSION OF THE URINE.

Description.—This is an affection in which the work of the kidneys in secreting the urine is very defective or altogether abolished. There may be some pain in the back or irritability of the bladder, the patient becomes anxious and restless, then dull and drowsy, and finally after an interval of from three to eight days usually dies comatose. In other instances there is nausea and vomiting, hiccough, and the whole body exhales a urinous odor. Where the suppression is less complete, and depends upon some obstruction to its outflow in the ureters, bladder, or urethra, the mind remains clear for a long time, perhaps, and the unfortunate patient is fully conscious of the intense local suffering and general dis-

tress produced. The time during which the urine may be suppressed and yet the patient recover varies considerably.

Hysteria.—In hysteria, cases where no urine has been passed for ten days are reported, but such instances are not free from suspicion of possible deception on the part of the patient. Children when teething will sometimes for days together void only a few drops of urine at once, and that at several hours' interval. The urine passed at such times is extremely high colored, stains the linen, and is passed with great pain, the child crying bitterly, as it scalds the sensitive surface over which it flows. This disease probably arises, at least in some instances, from over-congestion of the kidney.

Treatment.—The treatment recommended is to place the patient in a warm bath, and give a saline diuretic, such as a teaspoonful of cream of tartar, or twenty grains of acetate of potash dissolved in half a pint of water, combined with a moderate laxative. The sweet spirits of nitre, in half teaspoonful doses, is also frequently useful. Digitalis leaves made into a poultice, or the tincture of digitalis added to a flaxseed poultice, have often proved beneficial, and the digitalis may also be used internally with advantage in the form of a teaspoonful of infusion every four hours, or Dover's powder, ten grains for an adult.

FLOATING OR MOVABLE KIDNEY.

The mobility of the kidney depends upon the relaxation of the surrounding structures.

Causes.—Females are most usually affected, probably due to the difference in dress between them and the males. Middle life. Any disease producing rapid marked emaciation predisposes to it. A congenital relaxation of surrounding tissues. Muscular exertion. Repeated pregnancies.

Diagnosis is made by feeling kidney in abnormal position.

Symptoms.—There is a dragging sensation in back. Kidney may become swollen and painful to the touch. There is a sense of uneasiness and attacks of neuralgic pains. Emotional disturbances are often excited by this condition.

Treatment.—Use abdominal binder or pad. Regulate diet. Avoid exertion. If the condition persists the only treatment is surgical.

RENAL OR NEPHRITIC COLIC.

Causes.—Since the ureters commence inside the kidneys as funnel-shaped tubes, it is obvious that any solid substance capable of entering the upper part and yet a little too large to pass the lower portion, will stick fast, and can only progress as the pressure of the constantly secreted urine behind it drives it along with sufficient force to dilate the pipe and allow it to move onward. This process of dilatation is horribly painful, and with that of passing a gall-stone, and of certain forms of neuralgia, makes up the worst physical suffering of humanity since the Spanish Inquisition was abolished. The little stones which cause such agony in this way are generally composed of uric acid, or less commonly of oxalate of lime, deposited from the urine inside the kidneys, and washed down from the seat of their formation by the outflow of that fluid. It is not positively determined whether they crystallize out of the urine because they are produced in too large quantity in the system, or because a deficient amount of water to hold them in solution is filtered out of the blood; but in either case, increasing the bulk of the renal secretion by drinking a larger quantity of water daily, is a most rational method for diminishing the tendency to their production.

Symptoms.—The first symptom of an attack of renal or nephritic colic is usually pain in the region of the loin on the affected side. This rapidly increases in severity until it becomes excruciating, and radiates downward toward the groin, the testicle on that side being drawn up, a symptom constituting in males—who are chiefly the subjects of this malady—an important diagnostic sign. With the pain, nausea and vomiting are apt to occur, and the body is covered with a cold sweat.

Treatment.—The treatment of nephritic colic is to relieve the pain, if only moderately severe, by hypodermic injections of morphia and atropia, or laudanum enemas, as advised in the article upon gall-stones; but if the suffering is intense, by the inhalation of ether or chloroform. In order to mitigate the pain sufficiently by these anesthetics, it is not usually needful to administer them to complete unconsciousness. A few whiffs will lull the distress so as to make it endurable for the time, and as this blessed influence passes off, it can be renewed by a repetition of the inhalation. Persons whose hearts and lungs are healthy, can thus be kept in comparative comfort with comparative safety, for several hours, or until the passage of the stone out of the lower end of the ureter into the bladder renders the anesthetic no longer necessary.

Passage of Stone.—It is probable that both morphia and ether tend, besides, to hasten the exit of the stone by relaxing the spasm, which no doubt is caused by the irritation of the angular corners of the cruel little calculus as it makes its way through the slender and sensitive tube of the ureter. After the passage of a stone of this kind into the bladder, it usually is voided with the urine, in the course of the next day or two, and in order to make sure that the enemy has been completely gotten rid of, it is best to carefully examine all the urine which comes away in the next few days after an attack. The character of the stone, when found, will afford some information as to the best mode of treatment to be adopted for the purpose of avoiding the formation of others of like structure.

Prophylactic Treatment.—Those who are subject to attacks of nephritic colic should live a quiet life, avoiding exertion as far as possible. The diet should be regulated as in gout. Diuretics should be taken and water in large quantities.

Sir William Roberts recommends what is known as the solvent treatment. Citrate of potash in doses of half to one drachm every three hours. Osler has not found this satisfactory. Piperazine in doses of five grains three times a day may prove useful as a solvent.

CYSTITIS OR INFLAMMATION OF THE BLADDER.

Symptoms of Acute Cystitis.—There is great frequency and urgent desire to urinate. The passage of very little urine at each act, accompanied by great pain above the pubis, and in the perineum radiating to the end of the penis and in the loins and sacral region.

The Urine.—The urine, at first clear, loses its transparency, becomes full of thick mucus and contains blood and pus. A rectal examination is very painful.

Treatment.—In treatment of cystitis remove the cause if possible. Put patient to bed, apply hot applications to perineum, give suppositories containing opium, one grain, and belladonna, one-sixth of a grain. Hips should be elevated and bowels opened by salines and glycerine enemas. An exclusive milk diet is often beneficial.

For the pain give a powder containing—

Extract hyoscyamus	4 grains
Extract cannabis indica	4 grains
Sugar	20 grains

Divide into ten powders, and take one every three hours.

Or five-grain doses of formin in half glass of water three or four times a day.

Suppositories of ichthyol, one grain, are often beneficial. All alcoholic stimulants must be avoided.

Symptoms of Chronic Cystitis.—In this condition there is frequent urination, but it is not so marked as in the acute form. The urine is ammoniacal, fetid and filled with tenacious mucus and pus; not infrequently blood. Constitutional symptoms rarely appear. Tuberculosis is a frequent cause of cystitis, and by careful straining and examination the bacillus tuberculosis can be found. This form is accompanied by pyuria (passage of urine) and pain.

Treatment.—1. If possible, the cause must be removed. Water is drunk in large quantities. Salol and boric acid, five grains each, every four hours, is very good.

2. Urotropin, five grains six times a day, catheterize twice a day, and irrigation of the bladder with solution of silver nitrate, one grain to a pint of water, or solution of permanganate of potassium (1-20,000). The bladder is washed out by attaching a glass nozzle to the catheter at one end, and to a funnel with rubber tube at the other. The funnel is raised to four or six feet above the patient, and bladder filled, and then fluid allowed to flow out. This is repeated several times until it returns clear.

CALCULUS, GRAVEL OR STONE IN THE BLADDER.

This is an extremely painful and annoying disease caused by stone or stony deposit in the bladder. When the system is healthy the ingredients forming gravel or stone are carried off without difficulty by the secretion of the kidneys. But when there is excess of uric or any other acid these particles sometimes unite and gradually grow and many find deposit in the kidneys or bladder.

It is supposed by some authorities to be in part due to the lime and magnesium contained in the hard water used for drinking in certain districts. It is more common in men than in women.

Symptoms.—Small gravel stones may pass off with the urine, sometimes with great pain, others remain to grow into stone. When the gravel or stone is too large to pass through the urethra the patient is subject to terrific spasms of pain, in groin, kidney, testicles, thigh and abdomen, but generally pointing to the direction which the stone seeks an exit; nausea and vomiting sometimes set in, and the pulse becomes weak and complexion pale. The patient is rendered uneasy by frequent desires to

pass urine. The flow of urine is often suddenly stopped and then resumed upon change of position. This is due to the stone obstructing the passage of urine at the neck of the bladder.

Treatment.—The medical treatment is only palliative, and similar to that recommended in cystitis and solvent in nephritic colic. The surgical operation of opening the bladder and taking out the stone, called lithotomy, and of lithotrity or crushing the stone, if of suitable size and texture, within the bladder, by means of a very ingenious instrument, afford, when successful, as they are in a large proportion of cases, a complete cure.

In acute forms warm baths, suppositories of a grain of opium and one-sixth of a grain of belladonna, flaxseed tea and the use of salty purgatives are recommended.

In chronic gravel, teas or fluid extracts of buchu are often used, and in stubborn cases five-drop doses of diluted nitromuriatic acid, or salicin in five-grain doses, thrice daily, may be given.

Relief may sometimes be obtained from a mixture of two teaspoonfuls of powdered borax and five of cream of tartar, dissolved in a pint of water, the doses being two or three dessertspoonfuls four times a day.

To relieve intense pain the following enema may be used:

Thin-boiled Starch ..... 2 ounces
Laudanum ..... 30 drops

This injection must be retained in the bowels as long as posible. If pain is very severe, put in forty drops of laudanum. In place of this injection thirty drops of laudanum may be given internally every six hours, but the warm enema is better. Hot compresses over the abdomen and back are also useful.

STRICTURE OF THE URETHRA.

Causes.—Usually the attention is attracted by the circumstance that the desire to urinate becomes more frequent, and the force of the stream diminishes, so that the renal secretion dribbles away in drops, or runs off in a very fine stream not larger than a knitting-needle. There is more or less pain in passing water, and a good deal of straining is required to accomplish the operation, which begins to be dreaded from day to day, and even from hour to hour.

Treatment.—The treatment of stricture is purely surgical, as, being a mechanical obstruction, medicines can accomplish nothing for its relief.

The usual method is by gradual dilatation, using first a small steel rod bent at the suitable curve and highly polished. This is to be warmed and thoroughly oiled, and then carefully passed into the bladder through the urethra, scarcely any force being employed. The great danger is that some of the inflamed and softened tissues in the neighborhood of the obstruction may give way, and what is called a false passage being formed, the condition of the patient is rendered far worse than before.

Using the Steel Rod.—The largest size that can be used successfully having been introduced, it is allowed to remain a few minutes and then an instrument of a little greater diameter is employed, and so on until the urethra, not without considerable suffering, is stretched to the original magnitude. In most instances, however, this dilating process must be kept up for months, the patient himself learning how to use the proper instrument, and introducing it at longer and longer intervals for a year or two until completely cured Various other methods for relieving the obstruction of stricture have been devised, such as external incision, cauterization, and so forth.

Emergency Treatment.—In the emergency of an attack of retention of urine, in a man who is the subject of stricture, coming on whilst far from medical assistance, the first thing to do is to get into a warm bath, since this will often procure sufficient relaxation of the spasm, which always makes up part of the narrowing of an irritated stricture, to allow a little urine to dribble away, perhaps whilst bathing, and so relieve the distress of the patient. If this fails a laudanum and belladonna injection or suppository, or a full dose of twenty drops of laudanum, will frequently have the desired relaxing effect, or ten grains of Dover's powder.

Self-Use of the Catheter.—Care should be taken to drink as little fluid as possible, so as to diminish the amount of the renal secretion to a minimum, until the avenue for its escape is again partially unclosed. If a catheter can be procured, the patient should try to pass it himself, choosing the time when he is still partly under the influence of the opium, which dulls the excessive sensibility of the urethra.

Substitute for Catheter.—In the absence of a catheter it has been most ingeniously suggested by Dr. Levis, of Philadelphia, to use a piece of bell-wire, doubled and bent to the right curve, along the sides of which, if safely introduced, enough urine might flow to relieve the over-distended bladder.

DISEASES OF THE PROSTRATE GLAND.

Causes and Cure.—Among the diseases of the prostrate gland the most important are chronic enlargement and calculus. This gland is situated just in front of the neck of the bladder, and encircles its outlet, the urethra. Hence its enlargement is apt to interfere with the outflow of the urine from the bladder as soon as it increases beyond a certain point. The difficulty thus caused in passing water is especially apt to affect elderly men, and would be very serious had not surgical science supplied a peculiarly formed instrument, called the prostatic catheter, by which the impediment can usually be overcome temporarily.

Inflammation of Urethra.—The urethra, which constitutes the final channel through which the renal secretion flows in making its exit from the body, is likewise subject to inflammation, and to obstruction from calculus, and, most important, to narrowing in consequence of inflammatory action. This contraction of the canal is called, as most people are aware, stricture of the urethra, and notwithstanding the numerous tales of accident producing this trouble, which are poured into the credulous ears of physicians, its true cause is, at least nine times out of ten, gonorrhea, which will therefore be considered in this connection. When a stricture is present a bougie should be used

GONORRHEA.

Character.—Gonorrhea, or, as it is vulgarly called, the clap is a specific inflammation of the urethra, the result of contagion and very seldom innocently acquired In the female it affects chiefly the vagina, and frequently extends to the uterus and ovaries.

Gonorrhœa is one of the most contagious diseases. It is caused by the germ called *gonococcus,* discovered by Professor Neisser. It spreads through illicit intercourse.

This disease is scarcely less dangerous, and is more prevalent than syphilis. It attacks all ages and spreads unchecked from one individual to another. It is a disease born of immorality and filth, and is a menace to the eyes of every child born of a woman suffering from the disease, or any person using or handling clothing, towels, etc., upon which the discharges from the penis (male) and vagina (female) have collected.

The danger of gonorrhœa and the main reason it spreads is due to the fact that the average sufferer thinks it a trifling disease, also that he de-

lays treatment because he is ashamed or frightened to tell his father or mother or even the family doctor—the man he should go to at once. Thus treatment is delayed while the sufferer becomes worse, uses secretly the patent medicines advertised, the family towel, puts his wash in the family laundry, eats and works along side of you and me, sleeps in hotels, the berths of sleepers, ocean liners, etc., where innocent children and others may come in contact with the germs of this filthy disease.

It is a mistake for a sufferer from gonorrhœa not to consult his own physician for treatment, who will protect him (much as he doesn't want to), instead of going to a physician of doubtful reputation, for there is no disease from which the quack reaps such a harvest as gonorrhœa, and every one poses as a specialist in its treatment.

The dangers from gonorrhœa in the female are far worse than in the male, as it leads to complications in the womb, ovaries, etc., and causes peritonitis and is responsible for many deaths from blood poisoning following child birth. But innocent married women who suffer from gonorrhœa are the ones to be pitied and suffer the most, for they are ignorant of their condition, and if maimed wonder why they are ill with a filthy discharge and often must undergo painful operations. They fail to receive proper and early treatment for modesty holds them back and they blame the trouble on some other cause.

Symptoms.—The first symptom in the male is a slight uneasy sensation or tickling at the mouth of the urethra, which is generally felt between the second and seventh day after exposure to infection. On examination the organ is found slightly reddened, and the natural discharge of mucus a little increased, and more viscid than usual. These signs of irritation soon pass into those of inflammation, in which the redness, heat, pain and swelling, characterizing that process, are all experienced in an exaggerated form The discharge becomes thick, yellow or greenish, and the pain on passing water, which must be done frequently, is very severe. Erections are frequent and painful. The penis is bent downward. These erections are called chordee. Sweling and inflammation of the glands in the groins, commonly called a bubo, is common, but the irritation seldom goes so far as to result in suppuration and abscess. Orchitis or inflammation of the testicle is more frequently observed. The disease is apt to last under the best treatment for a period of from four to six weeks, and if neglected or badly managed may be months before it is cured.

Treatment.—The most important part of the treatment is rest in bed, but as this can seldom be secured the inflamed parts should be supported

by a suitable suspensory bandage. At first the treatment must be that of inflammation elsewhere, that is by saline purgatives, such as a tablespoonful of epsom salts, low diet, and half teaspoonful doses of sweet spirits of nitre or ten grains of Dover's powder to promote perspiration. Wrapping the affected parts in cloths soaked in a mixture of four ounces of lead-water and two grains of acetate of morphia, and covered with oiled-silk is useful, and the injection of dilute solutions of the same medicines, made by mixing an ounce of this liquid with three ounces of water may be cautiously tried, or a one per cent. solution of protargal. In the first few days irrigation with a one to five thousand solution of permanganate of potassium. The scalding on voiding urine may be mitigated by drinking freely of flaxseed tea containing two drachms of acetate or bicarbonate of potash to the pint, and a belladonna and opium suppository at night, repeated in two hours if needful, will generally prevent much trouble from chordee. Internally globules copa-kava, one four times a day, are effective in acute or chronic conditions.

Diet.—The diet should be rice, bread with very little butter, milk, and, if necessary to keep up the strength, soft-boiled eggs. Meat, alcoholic and malt liquors, acids and condiments, are particularly objectionable.

Secondary Treatment.—After the first violence of the inflammation begins to subside the injections, such as silver nitrate, one grain to six ounces of water, or copper sulphate, one-half grain to the ounce, or acetate of lead and sulphate of zinc, each three grains to one ounce of water, may be made stronger gradually, allowing them to be of sufficient activity to produce a little smarting, lasting not longer than five minutes, each time they are used. They should be employed directly after each passage of urine, provided that does not occur oftener than once in two hours. At this period the administration of balsam of copaiba is usually commenced, and a good article of oil of sandalwood appears to be even more efficient in checking the remaining discharge, two capsules of either remedy being taken four times daily.

Third Treatment.—In the course of another week injections of acetate of zinc, sulphate of copper or nitrate of silver, one or two grains to the ounce of water, may come into service with benefit, but great care must still be exercised in regard to errors in diet, a single glass of malt liquor being frequently sufficient to bring on a relapse. If neglected or badly treated the malady may run into the chronic form, which is called gleet, and often proves exceedingly rebellious to treatment. Five-grain doses of salol, ten drops each of tincture of chloride of iron with tincture af can-

tharides thrice daily often, however, succeed in bringing about a favorable change, and the introduction of a bougie smeared with belladonna ointment three times a week is apt to contribute to the cure.

Formin Comp.—There are few who cannot recall the day of balsam copaiba and zinc injections. What a change in the treatment of disease—the antiseptic or germicidal treatment of the modern day! In the treatment of any disease of the genito-urinary tract the urine should be rendered sterile. Experiments made with formin comp. prove conclusively its value as a genito-urinary germicide, and the brilliant results obtained from its use place it foremost among the remedies of the genito-urinary specialist. In gonorrhea, acute and chronic, it serves to restrict the area of infection and prevent reinfection. Obstinate cases that have resisted other treatments should be placed on formin comp. in five-grain doses every three or four hours. It will clear up the urine without perverting its chemical reaction. The trouble with agents which make the urine alkaline is that they are incompatible with the gastric juice and must be given in doses large enough to more than neutralize the acid of the stomach. Formin comp. preserves the acidity of the gastric juice and produces an antiseptic irrigating fluid of the urine without interfering with the digestion or irritating the kidneys.

The Sanmetto Treatment.—We have also another agent possessing wonderful specific influence over the urinary organs when there is irritation or inflammation. It is called sanmetto, and is a combination of sandalwood and saw palmetto. It acts as a great vitalizer, increasing the strength of the reproductive organs, hastening their action, promoting their secreting power and increasing their size. The usual dose is a teaspoonful four times a day.

It is generally recognized by the profession that there is no disease which is so common and presents as many dangers to the human race at large as gonorrhea. The great danger lies in the fact that medical men are apt to be careless about the treatment. No man can pronounce his patient well and be sure that his urethra is free from the specific micro-organism unless he is able to make a thorough bacteriological examination of the patient's urine and of any discharge which may issue from his genito-urinary organs. The great source of general infection is the man who is told that he is "over his dose" because his discharge is apparently checked and he is able to urinate without using bad language at every dribble of urine. He is sent away with a host of virulent micro-organisms lying extant in his urethra.

Track of Gonorrhea.—The urethral inflammation commences at the meatus and travels slowly backward. There is no ulceration. The disease tends to limit itself and to become localized at the bulb, where the disease runs its course. Instead of getting well we have gleet, in which there is a certain amount of sticky fluid, often only a drop at the meatus in the morning continues to be secreted after gonorrhea, from altered patches of the urethra, or coming from the stretched and congested membrance behind a stricture. Gleet, then, is a symptom of two structural lesions, and signifies that there are patches of congestion in the canal, covered or not by granulations, or that stricture exists, and that the discharge comes from behind it. When an individual with a gleet is found to be gouty it is particularly advisable to enforce strict urethral hygiene.

Gonorrheal Complications.—Of the complications of gonorrhea we may have inflammatory phymosis, chordee, retention of urine and hemorrhage. The idea of aborting gonorrhea by the internal use of balsams has been abandoned. By abortive treatment is now understood the injection of any irritating soluble substance into the urethra for the purpose of inflaming the canal. Of these substances is nitrate of silver or argyrol, of the strength of half a grain to one ounce of water, the injection being carefully repeated every two or three hours until a trace of blood is seen in the discharges. Then all treatment must cease. The syringe used in the abortive treatment should never hold more than two drachms, and the fluid injected must be brought well into contact with every portion of the first inch and a half of the urethra

In true gonorrhea the abortive treatment will not avail after the disease is more than forty-eight hours old.

EPIDIDYMITIS OR SWELLED TESTICLE.

Swelled testicle (epididymitis) frequently accompanies or follows gonorrhœa and may appear at any stage of the disease, but it may result from several excesses without gonorrhœa, to the introduction of instruments into the bladder or to a blow upon the testicle. Usually but one testicle is inflamed though occasionally both are affected and sometimes the swelling switches from one to the other. Although a most painful affection the disease is seldom dangerous and usually there is a complete recovery.

Symptoms.—There is sometimes a dragging sensation in one of the

groins, tenderness in the connecting cord and pain in the back a day or so before any actual discomfort is felt in the testicles. There is apt to be a chill or chilly sensations at the onset of the disease, but the unmistakable symptom is the swelling of the testicle and the accompanying severe pain. The swelling increases steadily and the pain correspondingly augments, sometimes being of an aching character and sometimes neuralgic, occasionally darting to the hips and back. Nausea and vomiting are frequently an accompaniment of the swelling. The influenced testicle may become swollen to the size of a man's fist and cause painful tension of the scrotum. The duration of the disease varies. The severe symptoms usually subside in four or five days, but the enlargement and tenderness may continue for some weeks. In some cases where there has been considerable inflammatory deposit, the convoluted portion of the seminal canal at the back of the scrotum, known as the *epididymus,* may remain in a hardened state for months or years.

Treatment.—The patient should remain in bed, the scrotum being elevated in such manner as to relieve the tension of the cord. This also tends to moderate the rush of blood to the testicle. If early in the case the scrotum be scarified with nitrate of silver in strong solution (40 to 60 grains to each ounce of distilled water) the pain will be alleviated and sometimes completely banished. When pain is unusually severe relief may be afforded by a hypodermic injection of morphine under the skin at the location of the cord. Half an ounce of muriate of ammonia and one ounce of alcohol in a pint of water makes a lotion which applied to the testicle with absorbent cotton, often gives gratifying relief. A thick, warm linseed-meal poultice also frequently abates pain. Other treatments are lead water and laudanum. The testicle should later be supported by a proper bandage or suspensory. Severe tension of the scrotum may be relieved by pricking the scrotum in such manner as to let out the serum, but this should not be attempted by anyone but a competent surgeon.

VARICOCELE.

Varicocele is a term used to designate a swollen or knotty condition of the spermatic or testicle veins. It occurs in about ten per cent. of males. The veins when felt by the fingers impart an impression as of a bunch of earth worms inside the scrotum and is generally on the left side. Among causes given are constipation, ungratified desire and exces-

sive sexual indulgence. In some severe chronic cases there may be a washing away of the testicle.

The treatment is either palliative or radical. The former is simply in the use of some means of affording the patient temporary relief, which may be accomplished by use of a proper fitting bandage or suspensory, frequently bathing the part with cold water. The radical cure is by cutting or tying the vessels. Local applications are not of material benefit.

SYPHILIS.

Far-reaching Effects.—Directly syphilis is due to immorality of individuals and did it affect only the guilty, humanity in general would not be so much concerned, but owing to its nature the disease is such that it is easily communicated to the innocent. Not only may it descend to offspring unto the fourth and fifth generation, but it may be given to a mother or a sister by a kiss or may be conveyed by use of a towel or any other article which the diseased has handled. It may be conveyed in so many ways that it is almost impossible to give them in detail, and thus it is that humanity in general, whether innocent or guilty, are deeply concerned and should not only be on personal guard but should act unitedly to the end of isolating victims as if the case were small-pox and so eventually suppress the disease.

Cause.—It is a disease the result of a specific poison produced solely by direct implantation of the contagious material, usually the purulent discharge from a venereal sore in a previously diseased person.

Development.—About a month after it is in any mode implanted in the human system it appears to begin a development throughout the whole organism, and penetrating to every part of the body, affects especially the skin, glands and throat in the form of secondary symptoms, and still later the cartilages and bones as tertiary manifestations, until finally, if unchecked, it often proves fatal, after intense and prolonged suffering.

Local Symptoms.—The first symptom of this horrible disease is usually a primary sore or chancre, which appears as a small pimple or blister upon some part of the organs of generation, or point of contact, any time within two or three weeks after the infection is received. The great distinction between the syphilitic ulcer, or true chancre, and the chancroid, or non-syphilitic sore, is that the former has a hardened base, but the most

eminent surgeons admit that neither this nor any other criterion is infallible. The infecting pimple may dry up without ulcerating, but more commonly a cup-shaped sore from an eighth to three-eighths of an inch in diameter, and with raised edges, is formed, and unless modified by treatment lasts for a month or six weeks, when it heals up, leaving a hardened lump of a dark red coppery or bronze color, which is often several months in completely disappearing. The glands in the groins during the ulcerating stage of the primary chancre become swollen, hard and slightly painful, but seldom suppurate. After some weeks the other lymphatic glands partake of this enlargement, and gradually those in the armpit, in the neck and behind the ear give evidence of the general infection.

The Chancroid Sore.—The chancroid, sofe-chancre or non-syphilitic sore, generally develops in a few days from the date of infection, first as a minute vesicle, then a pustule, and later as an ulcer, round or oval in shape, with clean-cut edges, and without any hardening of the base. The floor of the ulcer is generally covered with a thick yellowish matter, which is virulent and contagious in the highest degree. The glands in the groins are often not swollen, but if affected are much more apt to suppurate, constituting a bubo, the discharge from which is also intensely contagious. It is therefore far more troublesome than the primary syphilitic sore, and yet infinitely to be preferred to the latter on account of the absence of any constitutional infection.

The following is a diagnosis between chancre and chancroid:

Chancre.	Chancroid.
1. Appears two to twenty days after exposure.	1. The interval between exposure and appearance is much shorter.
2. Is usually single.	2. May be multiple.
3. Inflammatory phenomena comparatively slight.	3. Inflammatory phenomena, heat, pain, redness and swelling very marked.
4. Discharge is serous or bloody and readily inoculable.	4. Discharge, profuse, purulent, very irritating and readily inoculable.
5. Margins of preputial orifice are not markedly inflamed.	5. Induration, if present, is not marked.
6. Marked induration.	6. Buboes, if present, are usually on one side, and suppurative.
7. Buboes are invariably present, and in both groins; they rarely suppurate.	

Constitutional Symptoms; Secondary.—After a true or hard chancre has developed, and no matter whether it has healed promptly or is still open, there appears in about four weeks, on an average, from the first infection the first of the train of general or constitutional symptoms. These consist of the tumefaction of the lymphatic glands, followed after a

few weeks more by fever, headache, rheumatic pains and soreness of the throat. About the tenth week after the dearly-bought pleasure its unfortunate purchaser usually finds a crop of eruption appearing upon his skin, sometimes slight and easily concealed, but oftener well defined and in a tell-tale abundance, which instantly reveals his guilty secret.

The Eruptions.—This eruption may be of pimples, pustules, or scales, the former being the most common and having a new copper-colored red or brownish-red tint, which, when well marked, is to the experienced eye very characteristic. It is apt to be especially abundant round the sides of the nose and angles of the mouth and eyes, the roots of the hair on the forehead and back of the neck, the centre of the breast, the inner side of the limbs, and around the armpits and groins.

Hand and Feet Eruptions.—An important diagnostic mark of the scaly, syphilitic eruption is its appearance on the palms of the hands and the soles of the feet. These manifestations are also particularly liable to appear as pustules among the hair of the scalp. In some cases the whole body is thickly covered. After persisting for periods varying from two or three weeks to as many months, these spots usually fade, leaving behind them brownish stains which are very persistent, but ultimately may give place to pale scars, somewhat like the pitting of small-pox in a very mild form.

Other Appalling Symptoms.—In a minority of instances the patient escapes any well defined symptoms, but suffers instead from one of the following manifestations of secondary syphilis, which often accompany the eruptions also: Alopecia or falling of the hair, which in bad cases may include not only that of the head, but also the eyelashes and eyebrows; flat whitish sores in the mouth and anus, called mucous patches, the discharge from which in the former situation may easily convey, by kissing, the whole vile disease to a perfectly innocent person; inflammation of the iris injuring or even destroying the sight; and local diseases of the generative organs.

Tertiary Symptoms.—The late or tertiary symptoms of venereal disease are disease of the cartilages and small bones of the nose and throat, producing the shocking disfigurement of the countenance sometimes seen, especially among sailors; disease of the bones of the skull leading to persistent and excruciating headache, and sometimes actually perforating the cranium; disease of the tibia or large bone of the leg between the knee and ankle; disease of the nails which may entirely ulcerate out; disease of arteries which, of course, is most apt to prove fatal, and peculiar new

growths called gummy tumors, which may appear in all parts of the system.

Congenital (Birth) Syphilis.—Congenital syphilis generally shows itself between the third and sixth week after birth, by cutaneous eruptions, similar to those seen in the secondary period of acquired syphilis, and of most frequent occurrence upon the buttocks, abdomen, palms and soles.

Symptoms.—Congestion and subacute inflammation of the mucous membrane of the nose, with increased discharge, vulgarly called the snuffles, also appear, and the infant has usually a peculiarly shriveled, weazened aspect, like that of a prematurely old man. Mucous patches from about the baby's mouth may infect the mother or nurse, and keratitis or inflammation of the cornea of the eye is lamentably common. Early and active administration of mercury is very important, lest the syphilitic cachexia prove fatal.

Local Treatment of Chancre.—The treatment of the primary sore, or chancre, is much disputed. Cauterization with nitric or tr. chloracetic acid, or the acid nitrate of mercury, and subsequent dressing with black-wash—a mixture of a drachm of calomel, and a pint of limewater—is much employed; but the application of iodoform is highly recommended. Complete excision of the sore, with its hardened base, in the hope of preventing secondary symptoms, has been tried without success, even when performed early. If the enlarged glands in the groins give rise to much discomfort, they should be painted over with the tincture of iodine or twenty per cent. ichthyol ointment.

Treatment by Caustic.—The prompt destruction of the chancroid ulcer by caustic, and the dressing with black-wash or yellow-wash, is advisable, and hope may be entertained of thus putting an end to the whole malady. If the glands in the groins go on to suppuration, however, very serious trouble may be anticipated before a cure is effected.

Constitutional Treatment.—The treatment of the secondary symptoms is by the use of mercury, which, although decried by some physicians, is considered by our best authorities as the only effectual remedy for syphilis. It may be administered by inunction of mercurial ointment, by fumigation, or in the form of half a grain of calomel, or blue pill, or one-third of a grain of the iodide of mercury thrice daily, or protiodide of mercury one-fourth grain three times a day. It is also given by hypodermic injections of the bichloride, one-third grain, once a week. The injection must be made deep into the muscles. Proper precautions must be taken to cleanse the needle and syringe before using, also the skin at point at which

the needle must be inserted. This treatment should be kept up at intervals for a year or two after an apparent cure has been effected. To obtain its beneficial effects, which are often very marked and satisfactory, it is not necessary to induce severe salivation, which, probably, in former times, often aggravated the ultimate effects of the syphilitic poison.

Treatment of Third (Tertiary) Stage.—In the tertiary stage, iodine and iodide of potassium, in the form of the compound iodine solution, or the iodide occasionally in very large doses of fifteen or twenty grains, thrice daily, are the great remedies; but they may sometimes be associated with mercurials to much advantage. In a majority of instances, the development of well-marked tertiary symptoms may be prevented by judicious treatment in the second stage of the complaint, and even when a slight tendency to disease of the bones and cartilages is displayed, a combination of the iodides with mercury will often avert disastrous consequences, or the sirop Gibert.

Use of Tonics.—Throughout the whole management of the case the administration of tonics, such as iron, quinine and strychnia is very important, and strict attention to hygiene by promoting the best general health is an almost indispensable condition to securing a favorable result; also frequent hot baths.

Should Syphilitics Marry?—Professor Alfred Fournier, in a late instructive work on syphilis and marriage, formulates some valuable conclusions in regard to the very difficult problem, from a hygienic point of view, whether a syphilitic person ought to marry or not. He asserts that a man who enters upon marriage, with syphilitic antecedents, may become dangerous: first, to his wife; second, to his children; third, to the interests of his family. In the first place the wife is apt to be infected directly by contact with the pus of secondary lesions; and Dr. F. says: "I know from long experience that it is rare to see a young wife live with a syphilitic man, or conversely, without the health of the former being effected by the diseased one." It was this which caused a witty French observer to say: "The pox is partaken of by a married couple equally, just like the daily bread."

Syphilis Conveyed by Conception.—Secondly, a man may convey syphilis to his wife by causing conception, as when a young girl, pure and healthy, is married to a man whose venereal disease has not been thoroughly cured. The physician calls a few months later and finds her diseased with, for example, distinct secondary symptoms, such as cutaneous syphilides, mucous patches in the mouth, scabs on the scalp, swelling of

the glands in the neck, headache, vague pains, lassitude, febrile attacks, loss of hair, and so forth—all this without a trace of chancre, and even without that faithful companion of a chancre, a bubo, which M. Ricord calls so aptly the posthumous witness of a chancre. In these lamentable instances, the wife-mother infected without having had any primary symptoms, and whose husband has long been freed from all external indications, is diseased, not from that husband, except indirectly, but from her child still within her womb.

Danger to Children.—As respects the danger to children: Although offspring may be begotten by a syphilitic father who enjoys good health, yet the hereditary influence of paternal syphilis is very far from being as innocent, minute or negative as has been maintained.

Development of the Inherited Tendency.—This inherited tendency may be developed in the three following modes: Either that, which is an exceptional case, by the transmission of syphilis to the fœtus; or that, which is sufficiently common, by the death of the child; or lastly, by the inherent degeneration of the germ, which ultimately reveals itself under a great variety of morbid conditions.

Worst Form of Danger.—But the worst form of danger to the family of a syphilitic father is that communicating the disease to the wife, the paternal and maternal influences will act upon the same side, and most disastrously conspire in unison against the fruit of any pregnancies which may result. In such sad cases we can predict that, with a few rare exceptions, either, first, and the child will die before birth; or, second, it will be born with syphilis, and with all the possible and serious consequences of infantile syphilis, which in many cases are equivalent to death itself; or finally, third, it may be born without syphilis, but with uncertain health, with a weak nature and a feeble constitution, which will probably expose it to a rapid death; with menacing morbid tendencies; with a predisposition to certain organic diseases—in a word, to a relatively speedy decay; this terrible fate being visited again and again upon successive innocent babes.

Transmission of Syphilis.—At the New Orleans meeting of the Public Health Association, Dr. Gihon of the Navy, as chairman of a committee on the subject, presented a valuable report, in which he remarked: "Every one instinctively shrinks from the touch of the sufferer with smallpox, but how few realize that a syphilitic is a leper also to be most scrupulously shunned? How few mothers are aware of the danger, to themselves and their children, from nurses and housemaids drawn from a part

of the population in which every fifteenth person is thus diseased? How few parents suspect the peril to their daughter from her accepted lover's kiss, since he may be that one in about every five young men among the better classes who has a venereal disease, which there is one chance in two is syphilis."

Transmission of Syphilis by Kissing.—These are not mere speculations, for Professor Gross reports that he has seen many cases communicated by kissing; and he tells of fifteen women, nine children, and ten men diseased by a single midwife, who had a chancre on her finger, contracted in the exercise of her profession, and who had thus carried the disease from house to house.

Transmission by Cooks and Nurses.—Dr. J. Marion Sims says: "I have seen a cook and a chambermaid with syphilitic ulcers on their fingers; I have seen nurses infected by the children they had nursed, who were born of syphilitic parents, in turn infecting sucking babes, born of healthy parents; and I have known a drunken vagabond husband to contract syphilis and communicate it to his wife, who in turn gave it unwittingly to her four children, simply by using the same towels and washbowl."

Transmission by Towels.—One of this very committee adds the case of an estimable and venerable lady, who lost her eyesight that year, from a venereal affection arising from using a towel in her son's room, carelessly left by him upon the rack; and of another, the wife of a clergyman, who the preceding summer sought relief at a Virginia spring for a horrible affection contracted in domestic contact with her servant.

Transmission by Pipes and Cigars.—The present Surgeon-General of the Navy saw a number of cases of chancre of the lips among the smokers of one set of cheroots, of which the wrappers had been moistened by the saliva of a Manila cigar girl; and at Beyroot he learned that it was not unusual for syphilis to be contracted by using a *narghileh* that had been pressed by the lips of a diseased smoker. How many people would venture to eat Smyrna figs if they had seen the top layer of the choicest box pressed flat with the saliva-wetted thumb of the packer, who, there was one chance in ten, was a syphilitic?

Transmission by Exhalation.—A certain lady was terribly alarmed when told by her husband, a physician, that she had invited to her table a young man who, in the course of a physical examination that morning, he had found to have his mouth and tongue covered with mucous patches; and that her daughter was dancing in a public ballroom with another whose body was repulsive with syphilitic eczema.

Transmission by Instruments.—An editorial in one of our Philadelphia medical journals not long since stated: "It has happened to the writer to be recently called to see a man of most respectable surroundings, who bore an unmistakable venereal sore upon his lip, and subsequently manifested all the features of secondary syphilis. It was said that this sore had followed a trifling surgical operation upon the part affected for the removal of a slight deformity, during which the instruments or the hands of the surgeon had inoculated him with syphilis.

Ever-Present Dangers.—This energetic committee urged that it should be promulgated everywhere throughout the community, that so long as syphilitics are allowed to go unrestrained the spotless woman and the innocent child share the danger of this horrible contamination with the libertine and the courtesan.

The Various Ways of Transmitting Syphilis.—Let it be known by everyone, they exclaim, that this fearful pest may be communicated:

1. By the blankets of the sleeping car, the sheets, towels and napkins of the steamship, hotel and restaurant.

2. By the hired bathing dresses at a seaside resort, and the costumes rented for the fancy ball.

3. By the chipped edges of cups and plates, as seen at any hotel or eating house, and by the half-cleansed knives, forks and spoons of the same.

4. By public drinking vessels in a railway car or station, as well as the public urinal or water-closet.

5. By the barber's utensils, the comb and brush in the guest chamber, the hatter's measure, or the borrowed hat.

6. By the surgeon's and dentist's instruments, or the vaccinator's lancet.

7. By the broom or dust-brush handled by a parlor maid, or by the spoon or cup touched by the mouth of a cook or nurse.

8. By whistles and other toys sold to children in the streets by vendors with poisoned lips or fingers.

9. By playing or visiting cards which have been used, and especially by car tickets and paper money circulating in a city like Philadelphia, where 50,000 syphilitics are at large.

10. By the grasp of a friend's hand or the kiss of a betrothed lover, by the son to his mother and sister, the husband to his wife and unborn child, and by the latter to its mother.

SYPHILIS—A VEGETABLE TREATMENT.

Hematesene.—Under the former methods of treatment there was no remedy in the pharmacopœia which could be relied upon as a specific for syphilis, although there were many that had a very beneficial influence in aiding the disappearance of the symptoms. It was then, indeed, a question whether the disease could ever be effectually cured.

Mercury Not Relied On.—In former times it was thought that in mercury we possessed a specific against the disease, and when all sores were looked upon as syphilitic, and mercury was administered, a large proportion of supposed cures were recorded. In our modern times, however, the supposed success of the mercurial plan is not recognized.

The New Specific.—Recent investigation and research have brought to light a remedy called hemetesene, which is as much a specific for syphilis and blood-poisoning as quinine is for intermittent fever. Mercury and the iodides produce injurious effects if long continued, and should be avoided. Patients who have been treated by the old plan improve rapidly after taking hemetesene. In some patients an itching is produced; in others an eruption on portions of the body or limbs; in a few watery blisters in the palms of the hands and soles of the feet which require no particular attention except to cleanse them with water, adding a few drops of carbolic acid.

Comparison of Treatments.—This vegetable treatment is a certain antidote to blood-poison, and increases the number of red corpuscles in poor blood, while mercury and the iodides often produce a run-down condition of the system if taken for a length of time.

Effect of This Vegetable Treatment.—The effect of hematesene as a constitutional remedy rests, unquestionably, in its power of eliminating specific poison from the blood, and in its tonic power, increasing the proportion of red corpuscles in impoverished blood, thus enabling the system to throw off disease.

ANOTHER TREATMENT FOR SYPHILIS.

Salvarsan 606 Antisyphilitic Remedy.

Many observers at the present time are experimenting with this new remedy brought before the medical profession by Dr. Ehrlich, of Germany. The opinions of the profession at present vary as to whether we have a

specific for the cure of syphilis. At present it has proven successful in quite a number of cases, while some physicians have reported bad effects following its use. The following will give a resumé of the facts developed at this time, and also the mode of treatment. Of course, it should not be administered by anyone except a qualified physician. Syphilis is an infection of the system by *spirochœta pallida.* This is one of the protozoal type of organism, such as malaria, relapsing fever, etc. The pathological pecularity of organisms of this type is that they rapidly acquire immunity to the antitoxins developed in the body against them, and thus establish a more or less permanent residence in the body constituting a chronic affection. The protozoa also rapidly develops resistance to small doses of chemical poisons introduced into the system against them for curative purposes, as malaria is cured by quinine in large doses.

Mercury and arsenic are two chemical agents found to be especially destructive to the germ of syphilis. It having been found difficult to introduce enough mercury into the system to destroy the germs, without seriously injuring the patient, attention was turned to arsenic. By experiments Dr. Ehrlich announced to the profession that a combination of arsenic with soda would prove effective. This he has named Salvarsan, or 606.

Salvarsan is a light-yellowish powder, containing about thirty-four per cent. of arsenic; when dissolved in water forming strongly acid solutions, on account of this acid reaction, it must be neutralized before use. The preparation is administered only with great care by a physician, intravenous or by subcutaneous injection. Some observers have secured similar results by the use of cocodylic acid, a salt of the allotropic form of arsenic, by injections of one or two grains. It also appears that mercury, instead of being contra-indicated, at the same time may aid in a cure. It is hoped that all that is claimed for it will be fulfilled, and that humanity will be cured of this so-called great pox.

SPERMATORRHŒA OR INVOLUNTARY EMISSIONS.

As an appendix to the unsavory subjects discussed in this chapter, a few remarks upon spermatorrhœa and its usual cause are appropriate here. It would be impossible to estimate, with any approach to accuracy, the vast amount of anxiety and mental suffering needlessly endured in our community in regard to this disease. It is sad to think of the many men,

young, middle-aged and those who are still young in age and strength, who suffer from one or more of the above conditions, robbing them of all that is precious and so important to them. Many men are mere pigmies of what they should be. Because of this decline they are backward and sensitive, unaggressive in their business, easily discouraged, weak and nervous. instead of being strong and vigorous.

The Disease and Results.—That the disease called spermatorrhœa exists, and in rare cases does result in the utter wreck of mind and body, which is painted by these designing quacks in such sombre colors, cannot be denied, but that nineteen out of every twenty young men who have become alarmed by the occasional or even frequent occurrence during sleep of what they have learned to control whilst awake, have no real ground for their agonizing fears is equally indisputable.

Causes.—The usual cause of spermatorrhœa, of course, cannot be freely discussed in a popular work like this, and yet enough may be expressed in veiled language, the meaning of which will be only or chiefly comprehended by those who need the lessons inculcated, to accomplish, it is hoped, much good. Many young persons of both sexes, after being made aware of the danger in which they were becoming involved through evil examples, perhaps, of school associates, have earnestly tried to escape the thraldom of bad habits or early indiscretions.

Treatment by Will Power.—Some of those who have succeeded, by the exercise of a resolution and strength of will, for which they deserve great credit, have overcome their enemy, but are yet haunted with the fear that they have been irreparably injured in the struggle. This fear is entirely unfounded, as time will infallibly prove.

Treatment by Exercise and Nutrition.—A second and larger class are still discouraged by frequently recurring evidence that they are not in a natural and healthy condition, and some may even be so disheartened as to feel almost hopeless. For such plenty of exercise in the open air, good nutritious food, chiefly vegetable, occupation of the mind in some study or suitable recreation, and the proper medical treatment, can with a continued exercise of the will power during the waking hours speedily accomplish a cure.

Treatment by Hygiene and Medicine.—To a third class, who find themselves still unable to overcome temptation, much aid will be afforded by adopting the plan of hygienic and medical treatment hereunder indicated, and by diminishing, as the drugs mentioned can do, the force of the impulse itself, they may so reduce its power that a little additional resolu-

tion will suffice to achieve a victory. In this struggle they may find some support in the grand old maxim, "He that ruleth his own spirit is greater than he who taketh a city." Among the best remedies for this condition is the pill cann-aven. This should be taken for some time.

IMPOTENCY IN MALES AND FEMALES.

Impotence means a lack of ability to properly perform the sexual act. It may be partial or complete.

In females it may be due to faults in the ovaries, absence of perfect development, displacements, inflammations or degenerations, faults in the oviducts or fallopian tubes, faults in the uterus, faults in external organs, etc. Morbid conditions of the vagina should be corrected and morbid conditions of the womb overcome. Hot injections and hot baths are of great service where inflammation is a cause.

In males impotency may be due to advanced age, disease of testicles, absent or defunct erection, spinal irritation, malformation, non-development of the organs, early abuses, loss of will power, sexual excesses, gonorrhœa, gleet, alcoholism, etc.

In all cases, whether male or female examination should be made by a competent physician (avoid quacks) in order to determine the actual cause. The general health should be looked after and a tonic treatment should be carried out, among the remedies used being damiana, strychnine, phosphorus, etc. A good pill is the neuro-tonal or compound damiana. A direct and useful remedy is cantharides in ten-drop or fifteen-drop doses every three or four hours previous to desired intercourse. Dilute phosphoric acid, phosphate of iron and ergot of rye are also valuable. These remedies may be used by either sex and should be continued for some time.

Apparent impotency in the male is frequently due to lack of confidence. A newly-married person who finds difficulty in this way should not become disheartened. A full understanding of conditions and a masterful reassertion of confidence will prove of more avail than medicines.

PART IX OF BOOK IV

Treats of the Urine in health and disease and gives a series of tests for urine which may be used in the home.

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CURATIVE MEDICINE

PART IX.

URINE IN HEALTH AND DISEASE.

As a rule, in chronic diseases one of the first manifestations is a change in the urine, sometimes noticeable by appearance, but in other cases only discernible by careful examination. We shall first consider urine in normal condition and then the effects upon the same when the body is diseased.

Amount.—The normal quantity of urine varies from $2\frac{1}{2}$ to $3\frac{1}{2}$ pints in the twenty-four hours, the quantity being greater with men than with women. It is decreased by free perspiration and increased by chilling of the skin. The quantity of fluids taken is of course a factor. Different diseases affect the quantity in different ways, causing an increase in diabetes, in some nervous diseases, like hysteria and convulsions, also in apoplexy, convalescence from acute and inflammatory diseases and in enlargement of the heart. It is decreased by heat, in fevers, shock, stoppage due to heart disease, acute congestion of the kidneys, in diseases accompanied by purging and vomiting. In all forms of Bright's disease (with the exception of chronic diffuse and interstitial kidney trouble) and in all diseases before death, the decrease is due to obstruction in the bladder or the urethra.

Color.—The normal color is light amber, which deepens in shade if the quantity voided be decreased, and *vice versa.* The quantity of fluids drunk and the extent of perspiration also have effect on color. In disease it will be found pale, in diabetes, hysteria, interstitial nephritis and like disorders, the specific gravity usually remaining at or near normal with the exception of diabetes, where the specific gravity is very high, owing to the presence of sugar. It is high-colored in most other diseases and in acute fevers and inflammation. Reddish color indicates the presence of

abnormal coloring matter, usually blood. A dark brown color may be a sign of hemorrhage of the kidney. Urine which turns greenish on standing contains bile pigments. In cancer the urine becomes almost black on standing, in typhus and cholera, blue. Both diet and drugs have effect on color. After taking rhubarb or senna the urine is apt to be brownish, santonin produces yellow and methyl causes a bluish color.

Odor.—There is a peculiar aromatic or urinous odor from normal urine, which becomes putrid and ammoniacal on standing. Fresh urine which has these latter characteristics indicates bladder trouble; a fecal odor indicates a fistule between the urethra and rectum. The odor may be changed by vegetables or drugs, turpentine giving the odor of violets, asparagus, turnips, cubebs, copaiba, sandalwood, etc., each producing their own peculiar odor. In diabetes the urine smells sweet. A particularly foul smell, as of sulphur, is given off when there is pus in the bladder.

Consistency.—The normal consistency is that of water, but it becomes thick and sometimes stringy on standing, more particularly after it has become alkaline. Where there is much sugar or albumin there is a tendency to frothiness.

Transparency.—Freshly passed urine in normal state is always clear, but after standing a faint cloud of excrete matter floats near the center and eventually settles to the bottom. This is increased in cystitis, prostatitis, urethritis and other catarrhal conditions of the urethral tract. It is more pronounced in women than in men. It may be distinguished from other cloudy substances by its tendency to float in the center and its precipitation by an excess of acetic acid. Bacteria, phosphates, or pus cause turbid urine. If due to bacteria, the turbidity is not cleared with acetic acid, whereas if due to phosphates, it will be cleared by a few drops of acetic acid. Urates cause a deposit to settle quickly, pus produces an opaque color which in a few minutes settles to the bottom.

Specific Gravity.—The normal specific gravity varies from 1.010 to 1.025. It is low when an increased quantity is passed and high when the quantity is diminished. Determination of specific gravity should be made by taking a small quantity of the total passed in twenty-four hours, care being taken that the vesel is absolutely clean before starting and that it is kept covered between the urinations. The specific gravity is increased at the beginning of acute fevers, after severe operations, at the commencement of acute Bright's disease and when the urine contains blood. It is exceptionally high in diabetes, sometimes reaching as high as 1.050. It

is diminished in Bright's disease (excepting the first stage of acute above referred to), in all forms of impaired circulation due to heart disease, in hysteria and in chronic interstitial nephritis.

Reaction.—The normal reaction is slightly acid, excepting after meals, when it may be neutral or even alkaline. Acidity is increased by a red-meat diet and diminished by obstruction and inflammation of the urinary tract.

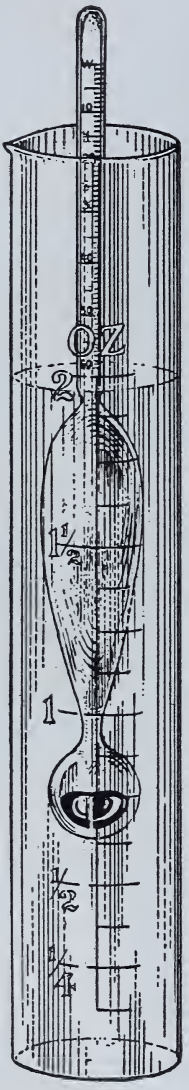
Constituents.—The most important organic and inorganic solid constituents held in solution are: *Urea,* from 308 to 617 grains daily; *uric acid,* from 6 to 12 grains; *urates* of *sodium, ammonium, potassium, calcium* and *magnesium,* from 9 to 14 grains; *phosphates* of *sodium,* etc., from 12 to 45 grains, and *chlorides* of *sodium,* etc., from 154 to 247 grains daily. The following table shows specifically the amount of solid matter contained in 1000 grains of urine of different densities.

Specific Gravity.	Solids.	Water.	Specific Gravity.	Solids.	Water.	Specific Gravity.	Solids.	Water.	Specific Gravity.	Solids.	Water.
1001	2 33	997.67	1011	25.63	974.37	1021	48.93	951.07	1031	72.23	927.77
1002	4.66	995.34	1012	27.96	972.04	1022	51.26	948.74	1032	74.56	925.44
1003	6.99	993.01	1013	30.29	969.71	1023	53.59	946.41	1033	76.89	923.11
1004	9.32	990.68	1014	32.62	967.38	1024	55.92	944.18	1034	79.22	920.78
1005	11.65	998.35	1015	34.95	965.05	1025	58.25	941.75	1035	81.55	918.45
1006	13.98	986.02	1016	37.23	962.72	1026	60.50	939.42	1036	83.88	916.12
1007	16.31	983.69	1017	39.61	960.39	1027	62.91	937.09	1037	86.21	913.79
1008	18.64	981.36	1018	41.94	658.06	1028	65.24	934.76	1038	88.54	911.46
1009	20.97	979.03	1019	44.27	955.73	1029	67.57	932.43	1039	91.87	909.13
1010	23.30	976.70	1020	46.60	953.40	1030	69.99	930.40	1040	93.20	906.80

The manner of using the above table is as follows: The density of urine passed in twenty-four hours having been ascertained, as hereafter explained under the caption "Examination of Urine," a glance at the table will show the proportion of solid matter and water in 1000 grains of the urine, then taking the weight of the whole quantity of urine passed in the twenty-four hours, the solids drained off by the kidneys may be determined by the simple rule of proportion.

Urine passed shortly after drinking excessively is pale and has a low specific gravity, varying from 1.003 to 1.009. That passed soon after the digestion of a full meal has a specific gravity of from 1.020 to 1.030. The best specimen of average density and nature of healthy urine is obtained in the morning before eating or drinking, and in perfect health should range from 1.015 to 1.025.

EXAMINATION OF URINE.



The Urinometer.

Different tests of urine are made for the discovery of different constituents, but in respect of all tests it is first necessary to determine whether the urine is acid or alkaline and to ascertain the specific gravity.

Acidity or Alkalinity.—Dip a piece of blue litmus paper in the urine and if on removing the color of the paper is changed to red or reddish-brown it will indicate that the urine is acid. If there be no change in the color of the paper then use yellow turmeric or reddened litmus paper. If the color still remains unaltered the urine is neutral, that is, it is neither acid nor alkaline, but if the yellow turmeric becomes brown, or the reddened litmus changes to blue, the urine is alkaline.

Specific Gravity.—For this purpose a urinometer should be obtained (see accompanying cut). It is also known by the names of hydrometer and gravometer and can be obtained at all surgical instrument houses and most drug stores. It is graduated in such manner as to show the different degrees of specific gravity and is utilized in connection with a small glass tube, also graduated, into which the urine is poured. When placed in still water the urinometer will sink to a certain point, and as all solids immersed in fluid displace a bulk equal to themselves, it follows that the urinometer will not sink as deep in a fluid which is denser than water. The instrument having been immersed in the tube of urine and come to rest, the number on the graduated scale which stands at the surface of the liquid plus 1.000 will represent the specific gravity of the urine. For instance, if the number at the surface be 7, the specific gravity will be 1.007; if it is 28, it will be 1.028.

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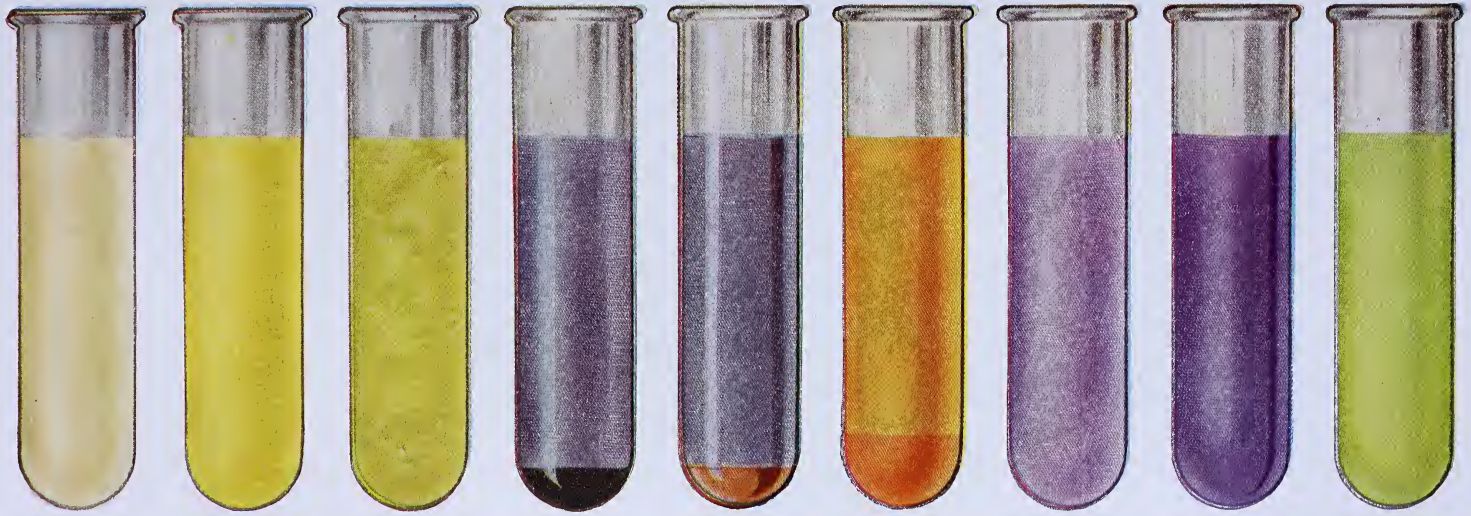
HOME TESTS FOR URINE



Normal Urine.

Albumen Test. Showing absence. Showing presence.

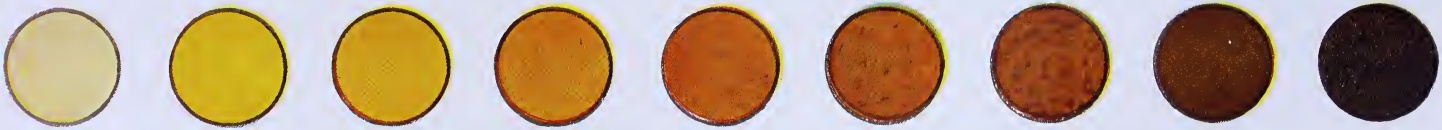
Sugar Test. Showing absence. Showing presence.

Brick Dust Sediment.

Indican Test. Showing absence. Showing presence.

Bilious Urine.

Standard Scale of Urinary Colors



Normal.

Concentrated Urine.

Hematuria or Bloody Urine.

Severe Inflammation.

How to Examine the Urine

Specific Gravity.—This should be done with a Urinometer. In health it varies from 1.012 to 1.025. In disease from 1.002 to 1.040. Determination should be made from 24 hours' urine.

Reaction.—Normal urine is slightly acid, and the test can be made with Litmus paper. If acid it turns the blue paper red or pink.

Transparency.—Normal urine freshly passed is clear, but on standing it becomes cloudy and finally there is a precipitate.

Consistency.—Normal is practically the same as water; becomes thick and stringy on standing.

Odor.—Normal urine has an aromatic or urinous odor; on standing becomes ammoniacal.

Albumen.—Test: Boil the urine and add a small quantity of nitric acid. If there is a precipitate and it does not dissolve albumen is present.

Sugar.—Test: Take a teaspoonful of Fehling's or Haines' Solution; boil and add a few drops of urine. If sugar is present there will be a reddish precipitate. If no sugar it will remain clear.

Indican.—Test: To a teaspoonful of hydrochloric acid add one drop of nitric and fifteen drops of urine and stir. In five to twenty minutes an amethyst color denotes normal amount present; a deep violet shows more than the normal amount.

PART X OF BOOK IV

Describes the many diseases which are peculiar to women, their causes, diagnoses, symptoms and various modes of treatment.

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CURATIVE MEDICINE

PART X.

DISEASES PECULIAR TO WOMEN

List of Diseases.—The diseases peculiar to the female sex comprise those of the uterus (womb), ovaries and their appendages, the vagina, external generative organs and mammary glands (breasts).

Divisions of Woman's Life.—The life of a woman may be divided into five periods. They are infancy, puberty, maturity, the menopause and senility.

Period of Puberty.—Puberty is the period in which the child becomes the woman, this is the period when she begins to menstruate. It is the time when the breasts begin to assume a rounded form, her general contour becomes shapened, and her generative organs have reached their full development. Maturity extends from puberty to the menopause, and is the period during which women bear children.

MENSTRUATION.

A Mother's Duty.—Menstruation or the monthly flow is characterized by a bloody discharge from the womb, and occurs at regular periods, usually every twenty-eight to thirty days. It is the duty of every mother to explain to her female offspring this condition of affairs, detailing when it occurs, how often to expect it, and the use of the napkin during this period. Too many mothers, on account of a mock modesty, allow their children to pass through the establishment of this function in total ignorance. Such practice, however, should be condemned.

Beginning of Menstruation.—I have often seen children run to their mother when the first drop of blood appeared, frightened beyond description. The first flow usually appears between the ages of twelve to four-

teen. In the torrid zone it appears two or three years earlier, thus these children are capable of child bearing at so early a period.

Frequency of Menstruation.—Every woman is a law unto herself. As before stated, menstruation usually appears every twenty-eight to thirty days; some women, however, menstruate every four to six weeks and are in perfect health. A napkin should always be worn during the flow; surprising as it may seem, many fail to do so.

DISORDERS OF MENSTRUATION.

Suppressed Menstruation (Amenorrhea).—This is a term applied to the absence of menstruation, between puberty and the menopause.

Causes.—Pregnancy, and when nursing; anemia (impoverishment of the blood (is a very frequent cause; consumption, debilitating diseases, non-development of the generative organs; obesity and after the ovaries have been removed.

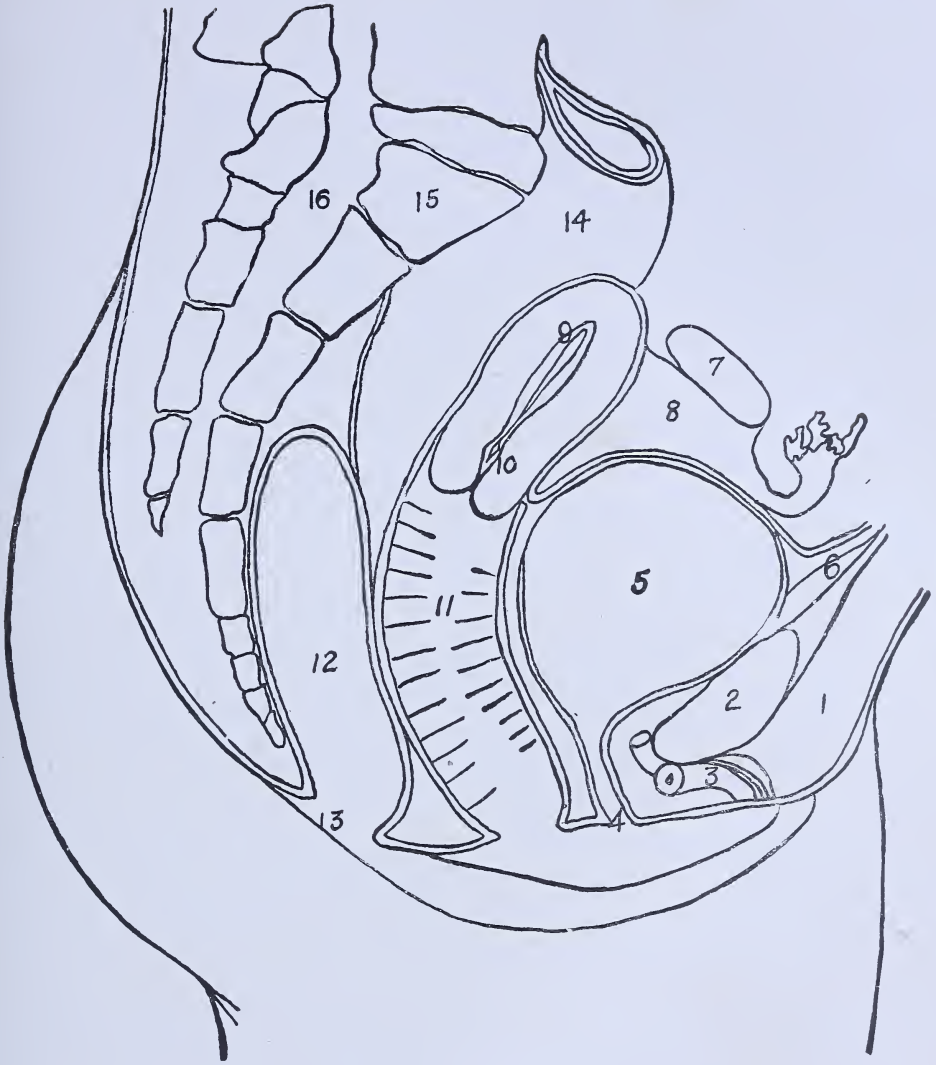
Symptoms.—Amenorrhea may come on suddenly or be of gradual development. The former variety is often the result of some violent excitement, fright or mental shock due to the setting in of some fever or other acute disease, or to that common and very dangerous cause, especially in young girls, imprudent exposure to cold or wet during the monthly flow.

Symptoms in Anemic Persons.—If due to anemia the patient has a pallor, and the margins of the lips will be pale, she will look "bleached out," shortness of breath, palpitation of the heart, swelling of the feet and ankles, headache and constipation.

Symptoms in Consumptives.—If due to consumption, cough and night sweats will be present, accompanied by marked emaciation (wasting away). When amenorrhea comes on gradually it is apt to indicate some serious chronic disease, which should be immediately investigated and attended to by a skillful physician.

Cessation of Menses.—When the cessation of the menses is part of such a severe malady as consumption or Bright's disease, it often appears to be only nature's method of economizing the failing strength of the invalid, so that any interference would be likely to prove positively hurtful. On the other hand, the natural reappearance of the menses after a stoppage in the course of a chronic malady may be welcomed as a favorable indication of a tendency toward improvement.

Symptoms Attending Stopped Menses.—The constitutional disturbance



1. Mons Veneris.
2. Pubic Bone.
3. Clitoris.
4. Urethra.
5. Bladder.
6. Urachus.
7. Ovary.
8. Broad Ligament.
9. Womb.
10. Neck of Womb.
11. Vagina.
12. Rectum.
13. Anus.
14. Rectum covered by Peritoneum.
15. Spinal column.
16. Spinal cord.

The above outline drawing will show the relative position of the Urinary and Generative Organs of Women, all contained within and surrounding the pelvis. This is shown by dividing the body directly through the centre from above downward. The various parts are plainly shown and designated by numbers, so that the position and shape of each organ can be readily seen.

from abrupt suppression of the monthly flow is generally very great. There is usually severe pain in the region of the womb, similar in character to that of colic, and hysterical excitement, or even convulsions, and mania, may be the direct effect.

Treatment.—When due to anemia, iron is the best remedy, given in the form of Bland's pill, one four to five times a day. When taking iron it is always a good rule to take a dose of epsom salts once a week, in order to counteract the constipating effect of the drug. Other remedies are, a teaspoonful of the elixir of quinine, iron and strychnia, three to four times a day; the pill of the same ingredients, one four to five times a day; permanganate of potash, two grains three times a day; or the bin-oxide of manganese, two grains three to four times a day.

When to Avoid Medicines.—The possibility that absence of the monthly period may be due to pregnancy should always be borne in mind, in which case it would be dangerous and criminal to administer any of the usual remedies for restoring the flow.

Treatment When Due to Cold.—When due to exposure to cold and wet resort to hot mustard foot baths or hip baths, mustard plasters to the inside of the thighs, calves of the legs and ankles. A hot sitz bath is also worthy of trial. This consists of partially filling a "foot tub" with hot water, allowing the patient to sit in it, and covering her with a blanket. She should remain in the bath for five to ten minutes. The buttocks and thighs are then thoroughly dried, and she is put to bed. If constipated the bowels should be regulated. (See Constipation.) Vaginal injections of hot water are also to be employed. (See "How to Use the Douche.")

Treatment of Young Girls.—The treatment of delayed menstruation in young girls who have passed the age of puberty must be on general principles adapted to improving the general health, unless there are signs of the menstrual blood being retained inside the womb, a dangerous condition which should always be considered in such instances and relieved as early as possible by a surgical operation.

PAINFUL MENSTRUATION (DYSMENORRHEA).

Meaning of the Disease.—By this is meant painful menstruation. The pain may occur before, during or after the flow. Many varieties have been described, such as the obstructive, congestive, mechanical, neuralgic, and so forth, but it is very difficult at times to differentiate them.

Causes.—Usually due to the womb being out of its normal position, tumors, and inflammatory diseases of the womb and ovaries.

Symptoms.—A woman who enjoys health not only menstruates regularly, but does so with perfect freedom from suffering, but unfortunately there are very few members of the female sex who pass through the whole period of their sexual vigor without being called upon to endure more or less frequently attacks of dysmenorrhea.

Pain With the Flow.—Some women experience great pain with each flow, from the commencement of puberty, every month, until the change of life relieves them. With the majority, however, pain is only the exceptional accompaniment. With some women marriage effects a cure, whilst in others, especially when there is sterility, it either aggravates or originates the dysmenorrhea. Under no circumstance, however, would a physician advise a woman suffering with dysmenorrhea to be married in the blind hope that it would effect a cure.

Bearing-Down Pains.—Bearing-down pains, not severe, are often present, accompanied by a sensation of weight. The pains as a rule are cramp-like, and intermittent, varying in severity. At times the pains are followed by the expulsion of blood clots which oftentimes affords relief. Severe pains as a rule necessitate the sufferer going to bed, where she may have to remain for several hours to a day or two. As a rule constipation is present, again diarrhœa may be troublesome.

Nausea.—Nausea followed by vomiting adds to the severity of the attack. Headache is invariably present. The pains may extend from the lower part of the abdomen down both legs. Pain in the back is oftentimes quite marked, the sensation being that of the back splitting open.

Treatment.—The existence of dysmenorrhea depends upon so many conditions that the treatment employed in one case will seldom relieve the next. During the attack of pain, the patient should take a hot sitz bath, and if the suffering is very severe, may have a suppository of half a grain of opium combined with a quarter of a grain of belladonna. Under no consideration should a hypodermic injection of morphine be given, without a physician's advice. Again, a sitz bath may be given, followed by a turpentine stupe, and ten grains of Dover's powder. Tincture of belladonna five drops every three hours may be given; or the following: antipyrine five grains every hour until four doses are taken, then every three hours until relieved; acetanilid five grains in the same manner; tincture of gelsemium ten drops every three hours; bromide of soda or potassium twenty to thirty grains every three hours; or as a final resort,

if the above-named remedies fail to afford relief, morphine, either by the mouth or a hypodermic injection, but only on the advice of a physician. Hot vaginal injections should also be tried, using at least a gallon of water.

Purgation.—Often when the attack is accompanied by constipation, a purgative dose of epsom salts or aloes will be of service.

Attention to the General Health.—Between the attacks attend to the general health. Employ the tonics mentioned in the treatment of amenorrhea. Take plenty of out-of-door exercise. Avoid undue excitement, straining or heavy lifting, the bicycle and dancing, as the time for the flow approaches.

Prevention of the Pain.—An endeavor should be made to prevent the pain if possible. The best drug for this purpose is tincture of gelsemium, five drops after meals, to begin ten days before the flow is expected. This is to be continued until the flow is well established, then cease until within ten days of the next period. It will prove advantageous at times to combine with the gelsemium five drops of the tincture of cannabis indica.

When Drugs Fail.—If drugs fail to afford relief, then it may be neccessary to dilate and curet (scrape) the womb, an operation which, when properly performed, will give excellent results. This operation will only keep the patient in bed ten days, and at the end of the second week she will be able to resume her routine duties.

EXCESSIVE MENSTRUATION (Menorrhagia and Metrorrhagia).

Meaning of the Disease.—When the monthly flow persists longer than usual or is excessive in amount it is called menorrhagia. When there is a bloody discharge from the womb between the monthly periods it is termed metrorrhagia.

Causes.—Both may be due to obstruction of the general circulation of the blood, from disease of the heart, lungs and liver. Tumors of the womb, inflammatory disease of the womb, ovaries and tubes. The more frequent causes are, getting out of bed too soon after confinement, retained portions of conception, due to improper care during a miscarriage (see Miscarriage), polypus tumors of the womb and cancer.

Symptoms.—Anyone suffering from either of these conditions should be examined by a physician in order that he may ascertain the exact caues and remove it; otherwise delay due to home treatment, should the cause be a dangerous one, may prove fatal. In a woman otherwise having

a normal flow, she will notice that the flow lasts a day or two longer, or may be excessive in amount, requiring a greater number of napkins than usual.

Excessive Flow.—The flow may be so excessive as to require rest in bed. When a large amount of blood is lost there will be pallor of the skin, dizziness, headache, extreme prostration, specks will appear before the eyes, she may feel as though she was falling through the bed. Or again, if the condition present is a metrorrhagia, there will be a discharge of blood between the periods, which discharge, if it becomes excessive, will give rise to the same symptoms just mentioned.

Treatment.—In the treatment of menorrhagia there are two indications to be fulfilled, first to check the present hemorrhage; and, second, to remove the cause upon which it depends, and so obviate the certainty of its recurrence. To accomplish the first of these desirable objects, which should not, however, be attempted in any monthly period, until the usual amount of blood has been eliminated from the system, say until the second or third day of the flow, try half a teaspoonful of ergot every three hours. Rest in bed is, however, an important part of the treatment, without which all the good accomplished by skillful medical care may be speedily dissipated. Other remedies are, half a teaspoonful of hydrastis canadensis every three hours; half a teaspoonful of witch hazel every three hours; gallic acid, 5 grains every four hours. Stypticin in 5 grain doses. A very good prescription for bleedings of this kind is as follows:

R.—Ext. hydrastis fluid (colorless) ..... 1 ounce
Ext. ergot fluid ..... ½ ounce
Ext. hamamelis fluid ..... 1 ounce
Aqua, q. s. ..... 3 ounces
Sig. One teaspoonful every three hours.

Plugging the Vagina.—If these remedies fail and the case is an urgent one, it will be necessary to tampon or plug up the vagina with pieces of raw cotton, lamb's wool, or linen cloth, taking care not to employ an undue amount of force in introducing these materials. They should have a string securely attached to them in order to facilitate their removal. In no case should such a plug or tampon be allowed to remain longer than twenty-four to thirty-six hours, for fear of poisoning the system with the putrifying blood entangled in it. When the tampon has been removed, if the bleeding is not checked, tampon again.

Removal of Tumors.—If the bleeding is due to the presence of tumors, it will be necessary to have them removed.

Further Treatment.—Frequently medicines and tampons fail to control the hemorrhages, especially when there is proud flesh in the womb, and when the muscles of the womb are unable to contract. In such an event the only procedure is to dilate and curet the womb, which operation will remove the source of the trouble. In some cases of dysmenorrhea enlargement and congestion of the ovaries appear to be the important factors in the production of the malady. Such attacks are apt to be very intractable, unless the disordered conditions of the ovaries are remedied, usually by an operation.

LEUCORRHEA OR WHITES.

Character of Whites.—This prevalent, troublesome and disagreeable condition, vulgarly termed the "whites," consists of a discharge of mucus or muco-pus from the womb, neck of the womb and vagina. It is very similar to that occurring from the nose during a cold in the head. In fact, the condition of the mucous membrane giving rise to leucorrhea is often one of catarrhal inflammation.

Causes.—It may be brought on by taking cold; by local excitement; by inflammation of the neck of the womb, the womb proper or the lining membrane of the womb; oftentimes the trouble is localized in the mucous membrane of the vagina; disease of the ovaries and tubes may also be at fault. It is frequently due to a "run down" system, yet women in perfect health may be affected; in the latter class it is probably nature's method of overcoming an excess in the richness of the blood.

Character of the Discharge.—The character of the discharge varies; it may be thick and tenacious, or it may be liquid, when it will run down the limbs in a stream and greatly soil the clothing. As ordinarily seen, it is not usually accompanied with much pain, but when very profuse, distress in the back and a dragging sensation in the lower part of the pelvis, often described as a bearing down feeling, are the symptoms most frequently observed. The discharge is generally more abundant a little while before, and for two or three days after the occurrence of the flow. In fact, when the leucorrhea is severe, this increase of the flow of whitish matter sometimes continues for a couple of weeks after the monthly period with increased violence, showing how greatly it depends upon a congestion of the parts concerned for its production.

Treatment.—The treatment of this rather intractable malady, besides the necessary attention to the general health, by the use of tonics and nour-

ishing food, consists of the employment of astringent injections into the vagina. For building up the health the following pill will be found of service:

R.—Acidi arseniosi (arsenious acid) ..... 1 grain
Ferri reducti (reduced iron) ..... 10 grains
Quinia sulph. (quinine) ..... 20 grains
M. Fiat in pil. No. XX. Sig.—One pill after each meal and at bedtime.

Additional Treatment.—If the leucorrhea is due to irritation of the ovaries, apply a cantharidal plaster over the groin on both sides. The best results, however, are attained by the employment of vaginal injections, such as a teaspoonful of creolin to two quarts of hot water; twenty grains of sulphate of zinc, or ten grains of sulphate of copper in the same quantity of water; thirty grains of alum to the pint; and a teaspoonful of lysol to two quarts of water are all worthy of a trial. A very cheap injection is made by adding one ounce of powdered oak bark to each pint of water, or one ounce each of tannic acid and glycerine to two quarts of water.

Treatment for Fetid Discharge.—When the discharge is fetid, permanganate of potassium should be used one-half drachm to one pint of water. This solution will stain linen, so be careful to avoid splashing it over the douche pan. (See How to Use the Douche.) Another very good drug to eradicate the odor of this discharge is bichloride of mercury. The druggists dispense a tablet containing seven and seven-tenths grains of the drug. One of these tablets added to two quarts of water makes a solution the strength of which is 1-4000. Such a solution should be used two or three times a day. All the injections above mentioned can be used night and morning, but if the discharge is profuse, three times a day will not be too often.

An Injection for Whites.—A very useful astringent injection for leucorrhea, whatever may be its cause, is the tri-septic douche tablet.

This tablet can be used night and morning and is effective and convenient.

Local Applications.—When the leucorrhea is caused by catarrhal inflammation of the cavity of the womb, as is frequently the case, injections into the vagina are, of course, almost worthless, and local applications made by a physician are very important, and should be faithfully persevered in, sometimes for many months.

HOW TO USE THE DOUCHE OR VAGINAL INJECTION.

Varieties of Syringes.—Before proceeding further let me describe the proper manner of taking a douche. First the varieties of syringes. These are numerous, but for practical purposes there are only two which are used to any extent. They are the Davidson, or bulb syringe, and the Fountain syringe.

The Bulb Syringe.—The bulb syringe is not to be recommended, because it is dirty, a great deal of muscular energy is required to work it, hence is tiresome and necessitates too much preparation for its use. It is very difficult to employ this syringe while lying down, and this is the only position in which a douche should be taken.

Using the Bulb Syringe.—In using this kind of a syringe generally a pint of the solution is placed in a basin over which the woman squats, and by squeezing the bulb forces the liquid into the vagina as fast as it runs out, thereby filling the syringe joints with the vaginal secretions, and returning to the vagina as soon as they flow away the impurities which have left it. If, however, a woman prefers this kind of a syringe, and insists on sitting over a bucket or other receptacle, then the solution should be placed in one basin, and that which is forced into the vagina permitted to run into the vessel upon which she is sitting.

Object of Using the Syringe.—The object of using the syringe is to bathe the vagina and neck of the womb. By sitting on a vessel the latter is prevented, for just as soon as a woman sits down, then the vagina is doubled on itself in such a manner as to prevent the solutions reaching the womb.

The Fountain Syringe.—The Fountain syringe is to be advocated, not only for this purpose, but for all-round family use. This syringe consists of a bag of soft rubber with a long tube and a series of hard rubber nozzles. The largest size is intended for the vagina. The "Alpha" is the best, because it has a valve at the opening which prevents the solution from running out at the top. This is a great advantage because the bag can be laid on the floor, a shelf or anywhere without spilling its contents.

Proper Way to Take Vaginal Injections.—The proper way to take a vaginal injection is as follows: First fill the douche bag, which should hold at least two or four quarts, with the solution which is to be used. Hang it on a nail, which should be driven near the bed. Then place the douche pan on the bed. A good douche pan should be large and capable of

holding at least one to two gallons. They are made of tin and agateware. Then lie down in bed, placing the douche pan under you in such a position that the buttocks rest on the top of the pan, in order that the solution after leaving the vagina will run directly into the pan without splashing over.

Improper Positions in Douching.—This is the correct way to take a douche. The other methods of sitting over a basin, or standing over a vessel, are to be condemned. This is the only way in which the womb can be bathed with the solution used, and not less than one to two quarts should be employed when a drug has been added; and when plain hot water is used, four to six quarts will not be too many.

Temperature of Douches.—All vaginal douches should be as hot as the patient can stand, and under no circumstances should cold water be used, as it is injurious. In exceptional cases hot water increases the pain instead of relieving it, and is then advantageously replaced by lukewarm water.

What Women Should Avoid.—Under no condition should a woman endeavor to introduce the small nozzle into the womb, or endeavor to force a solution of any kind into the womb. This is an exceedingly dangerous practice, and many a woman by so doing has sown the seed of pelvic inflammation, which has only been relieved by the removal of both ovaries, and in some cases the womb.

CONSTIPATION.

Woman a Constipated Animal.—The eminent Dr. Goodell once said: "Woman is a constipated animal." While we do not desire to class the gentler sex as an animal, still this statement contains a great deal of truth, for by far the greater majority of women are constipated.

Causes.—This troublesome state can be attributed to a number of causes, the most frequent of which is leading a sedentary life; omitting daily exercise, which tends to excite the secretions of the bowels and liver to their proper activity. Another very frequent cause is laziness pure and simple, the patient failing to go to stool when informed by nature that such should occur.

A Very Frequent Cause.—Modesty is a very frequent cause of constipation in women, because a woman prefers to suffer rather than to go to a closet which may be somewhat publicly situated. Hereditary muscular weakness, hepatic torpor, lack of secretions in the lower bowels, back-

ward displacement of the womb and lacerations of the perineum are frequent causes of constipation.

Symptoms.—General weakness, a feeling of languor and mental depressions are frequent symptoms; nervousness, headache, loss of appetite and a furred tongue may also occur. Individuals differ in this matter, one feels wretched all day without the accustomed evacuation, another is comfortable all the week except on the day which, by purge or enema, the bowels are relieved.

More Serious Symptoms.—When persistent the accumulation of the feces leads to serious symptoms, such as ulceration of the colon, perforation of the bowel, piles and inflammation of the bowels. The bowel contents may become dry and hard, forming large masses, which can only be removed by a physician with a great deal of difficulty.

Nausea.—In women who have been habitually constipated, attacks of diarrhœa with nausea and vomiting should excite suspicion, and lead to a thorough examination of the lower bowel.

Poisoning.—Part of the bowel contents may be absorbed by the system, giving rise to a general poisoning, which will recur at stated periods, until the constipation is cured. Costiveness is the recognized cause not only of hemorrhoids, of pelvic congestion, of inflammation of the womb and of disorders of the digestive apparatus, but also of the fecal poisoning just mentioned. For if diseases breed from bad drainage without the body, how much more from bad drainage and defective sewerage within the body! Feeble mothers beget feeble children—children who are carried from the womb to the grave, or who peak and pine under the heritage of ill health.

Other Causes.—Such then being the condition of the majority of American women, what is the cause? Probably no single cause has had so much influence in producing the peculiarly delicate condition for which women living in the country and in small towns in America are notorious, as the discomfort, inconvenience and frequent repulsiveness, and, I may add, indecent exposure, of their closet accommodations.

Insufficieny of Closet.—In the teeming tenement house of any of our large cities there is usually but one closet, and that is invariably a cesspool, wet and foul, reeking with filth, poisoned by noisome stenches, defiled by lewd couplets or by obscene cuts, indecent from thin partitions and wide chinks, or from being preoccupied by one of the opposite sex. Under such conditions what woman can avoid schooling herself into the habit of resisting the evacuation of her bowels?

Inconvenient Privies.—In the small houses of tradesmen and of mechanics the water-closet is rarely to be found, nor are the houses of the better classes always supplied with this luxury. The privy is then usually placed at the farther end of the yard, and approached by a long and unsheltered path. It is, therefore, almost inaccessible in bad weather or on dark nights, and is overlooked by the backbuildings of all the neighboring houses.

Risk to Women.—To a delicate woman the exposure to the weather is a serious risk; to one who is menstruating it is a constant menace; while to the refined woman the exposure to view compels the postponement of her physical duties to nightfall, or until driven to them by a sheer necessity which knows no law.

Country Closets.—Nor does the condition of the closets in the country present a more agreeable contrast. In many parts of the Southern and Western States a clump of bushes, the shelter of a rock, the nearest grove affords the only accommodations. But take the most thickly settled States, where is the small farmhouse whose privy invites rather than repels an operation of the bowels?

Privy a Misnomer.—The very name of privy is a misnomer. How seldom is the building hidden by clumps of evergreen, or a screen of lattice work. How often is it not an embarrassing distance from the house, at the end of a long trail, or, at least, of a long unkept path, which frequently runs parallel with a street or with a road.

The Outlandish Privy.—Where in the country, and for that matter in cities also, is not to be found the privy made up of rough boards rudely spiked together, with cracks wide enough to spoil all privacy, with a door without a bolt, and generally hanging by one hinge, with a crescent-shaped hole for a window, and with its sole object of furniture a barrel of rasping corncobs? When is it ever sheltered from the rude blasts of winter, or not poisoned by noisome stenches, acrid vapors and unclean flies? After such an unsightly but truthful picture, can we wonder that the calls of nature are looked upon as grievous dispensations of Providence, as hateful duties which are to be put off as long as possible and obeyed as seldom as necessary?

Repellant Conditions.—Imagine now broad daylight, with its busy traffic, a rainy or a dark night, the grass wet with dew, or the ground covered with snow, or the temperature, perchance, many degrees below zero. Under such circumstances what woman can respond to the calls of nature without putting herself to great discomfort, to great risk, indeed, if she

be menstruating, or without blunting the edge of her womanly sense of decorum.

The Antidote.—I have told you the bane; now what is the antidote? Clearly such closets as a civilized Christian people—a people living in the twentieth century—are not degraded in using; closets that are decent, comfortable and accessible; closets that invite rather than repel those in which an operation of the bowels is not tantamount to being buffeted by Satan for a season.

Country Earth Closets.—In cities, and in towns which are supplied with water works and good drains, the use of the water closet ought to become universal. In the country, where such a luxury can be attained by the rich alone, the earth closet is the only substitute; I cannot too strongly urge its adoption.

Treatment.—Much may be done by systematic habits. Set a certain time of the day, and at that time go to the closet and endeavor to have an evacuation. Continue with this each day, and permit nothing to interfere with this duty at that particular time. The desire to go to stool should always be granted; when there is a desire, go by all means.

Treatment of Stout Women.—In stout women with flabby abdomens the muscles should have the support of a bandage. Exercise is of great value; by far the best being horseback riding at least an hour a day, or every other day. Massaging the abdominal muscles is also of value. Much good can be accomplished by the daily use of the "home gymnasium," or dumb bells and Indian clubs.

Diet.—The diet should also be regulated. Very often if a plateful of cracked wheat is used at breakfast each morning, and bran bread taken in addition, a chronic tendency to constipation can be removed. Milk is not to be recommended. Green or canned corn is of great service. Fruits also do good. Nothing is so good as a glass of cold water taken on arising in the morning just before breakfast; or if the cold cannot be borne, then a glass of as hot water as can be swallowed may be substituted. It must be remembered that strawberries, raspberries and blackberries are constipating rather than purgative. Coffee has a binding effect on some persons; brandy is distinctly constipating, whereas whiskey has no influence one way or the other.

Treatment by Medicines.—The use of drugs for the relief of constipation consists in those that unload the bowel, which has become filled, and those which will cure the tendency. Let us consider the first variety. For this purpose may be mentioned epsom salts, half to one tablespoonful,

preferably taken in the morning on an empty stomach; mercury, in the form of calomel, one-fifth of a grain every hour until about ten doses are taken, then following with a bottle of citrate of magnesia; castor oil, half to one tablespoonful, or twenty grains of powdered rhubarb at bedtime.

To Cure Tendency.—Of the second class, half to one teaspoonful of the fluid extract of cascara sagrada at bedtime, or a dessertspoonful of phosphate of soda in one-quarter of a glass of hot water before breakfast. Rhubarb is not to be recommended for constant use, as it is astringent, and after the bowels have moved the constipation will be more pronounced than before. Mercury is exceedingly harmful if used continuously as a purge, and is the cause of much ill health, bad teeth, and digestive troubles. Castor oil is notorious for its tendency to ultimate constipation.

Very Best Drugs.—Of the curative class of drugs none compare to cascara sagrada, which should be used in the form of the tasteless fluid extract, or cascara cordial. This is the only drug which moves the bowels and at the same time tends to make the future movements more easy and regular; the dose is ten to twenty drops of the fluid extract every night at bedtime, or one to six teaspoonfuls of the cordial. If the fluid extract, in the doses above mentioned, fails to act, increase the quantity each night until at least a teaspoonful if necessary.

The following three prescriptions will be of value:

Aloes ..... 20 grains
Extract of nux vomica ..... 4 grains
Extract of physostigma ..... 3 grains
Extract of belladonna ..... 4 grains
Make into twenty pills. Take one pill at night or one night and morning.

Or,

Resin of podophyllum ..... 2 grains
Extract of nux vomica ..... 4 grains
Extract of physostigma ..... 3 grains
Extract of belladonna ..... 4 grains
Make into twenty pills. Take one at night or night and morning.

Or,

Aloin ..... 2 grains
Extract belladonna ..... 2 grains
Strychnine ..... ¼ grain
Extract cascara ..... 16 grains
Make into 16 pills. One at night.

Injections.—The employment of enemas, or injections, as a routine practice is to be discouraged. In cases where it is necessary to use them

for temporary relief, and to get rid of the gas, a little soap, common salt, and a few drops of turpentine may be added to the water.

DISEASES OF THE EXTERNAL GENITAL ORGANS.

Vulvitis.—This is an inflammation of the vulva, the part so often referred to by women as their "person" or "privates." It is divided into several different varieties, which can only be distinguished by a physician.

Causes.—One of the most frequent is lack of cleanliness; irritating discharges from the vagina and womb, which trickle over the parts; tight fitting drawers, which rub and chafe; injuries, as striking against chair, or falling on an object; selfabuse; excessive or brutal intercourse; pregnancy; fevers; may follow a long and difficult labor; and is apt to occur during an attack of diabetes.

Symptoms.—General discomfort, sensations of burning which amount at times to severe pain; burning pain during urination; the parts are usually swollen and very red. In diabetic vulvitis the itching is intense and oftentimes is the first symptom of diabetes. Every woman who passes large quantities of water and suffers from intense itching of these parts should have her urine analyzed to see if it is due to diabetes. Owing to the fever and swelling the parts at first are dry, due to the lack of secretion; but as this increases the parts become raw and very painful.

Treatment.—Cleanliness is the first consideration. Warm sitz baths, hot vaginal injections of plain water, or water to which has been added creolin one-half a teaspoonful to two quarts, borax a teaspoonful to the quart, or a dessertspoonful of salt to the quart. Use these several times a day. After thoroughly cleansing the parts, they may be dusted with talcum powder, starch, or starch and bismuth, equal quantities, bismuth or borax.

Checking the Beginning.—Oftentimes the attack can be checked at the beginning by applications of lead-water and laudanum. The best way to apply this is to soak a piece of absorbent cotton, about the size of the hand, with it, and place it in between the legs.

Treatment by Injection.—If the irritation is due to worms, a rectal injection will usually remove them. If the itching is very severe try hot vaginal injections of bichloride of mercury, seven grains to the quart; salicylic acid the same strength; or a solution of hyposulphite of soda, one ounce to the pint of water. After the parts have been dried any of the following will be found beneficial: benzoated zinc ointment; iodoform

ointment; solution of carbolic acid, half a teaspoonful to a cup of water; nitrate of silver, eight grains to the ounce of distilled water, and painted over the parts oftentimes affords the greatest relief. The bowels should be kept freely open.

PRURITUS (ITCHING OF) VULVA.

Definition.—By pruritus is meant itching; the privates are the one part of a woman most frequently affected with this troublesome condition. Pruritus is not a disease, but a symptom of other conditions.

Causes.—It is of frequent occurrence during pregnancy, and very often the result of uncleanliness; is invariably caused by irritating discharges from the vagina; may be associated with tumors of the parts, and is often present during the course of diabetes.

Symptoms.—Intense itching, the woman is almost driven to desperation, and scratches the parts until they bleed. The itching is usually aggravated by walking or becoming warm in bed. This condition may be so marked as to lead to melancholia. The intense suffering causes loss of sleep, exhaustion, and sometimes alarming nervous depression. The more the patient is compelled to scratch, the more the parts are irritated.

Treatment.—Remove the cause if it can be found. In order to remove irritating discharges sitz baths and vaginal douches, as described in the treatment of vaginitis, are used. After thorough cleansing of the parts they may be dusted with calomel, bismuth, starch or lycopodium powder. The calomel is generally preferred. Before applying the powder first dry the parts. Great relief is sometimes experienced from a gauze compress over the vulva, saturated with a solution of lead-water and laudanum, equal parts. This dressing should be frequently changed.

Auxiliary Treatment.—The intense itching which appears at night after retiring can often be prevented by applying to the vulva cloths wrung out in hot water. Ointments are useful from their soothing effects and, in addition, they protect the parts from the irritating discharges. These are iodoform ointment, sulphur ointment and zinc ointment.

HEMATOMA (BLEEDING) OF THE VULVA.

This term is applied to any hemorrhage which may occur in the tissues of the privates. It usually occurs on one side, rarely on both.

Causes.—The most frequent are falling on a sharp substance; very often while housecleaning a woman will stand on a chair which, should it

slip, may cause her to fall in such a manner as to straddle the back of it; the insane may self-inflict wounds in this spot. Among other causes are intercourse, pregnancy, tumors and diseases of the blood-vessels supplying the affected parts.

Symptoms.—The symptoms are practically those of injury to any other part of the body. The bleeding may be very profuse, especially if there is a cut. If the parts are only bruised the bleeding will be more or less extensive, the blood simply pouring out into the tissues, causing a swelling of the parts. There will be pain of a sharp or tearing nature, which may be accompanied by faintness. If the swelling is large, it may press on the urethra, and cause difficulty in passing water.

Treatment.—The bleeding may be controlled by the application of ice or by using pressure or both. Simply take a clean napkin and hold it tightly against the injured parts. After the blood has been in the tissues for a few hours a hard blood-clot forms. If this is not absorbed within a few days the part should be lanced and the clot turned out. If the swelling is small lead-water and laudanum applied to the parts on pieces of gauze may cause it to disappear.

TUMORS OF THE VULVA.

The vulva, like any other portion of the body, is subject to the occurrence of tumors which may or may not be malignant. If such a tumor growth should occur a physician should be consulted, in order that he may diagnose its exact nature and institute the proper treatment. Too often innocent looking growths have been allowed to go unattended, which, when too late, have been found to be cancers.

SKIN DISEASES OF THE VULVA.

The skin of the vulva may be affected with various skin diseases, as eczema, erythema, acne, herpes, prurigo, scabies, pediculi and erysipelas.

Causes.—The various diseases are due to irritating discharges from the vagina or womb, menopause, vesico-vagial fistula, indigestion, diabetes, and in stout persons during exceedingly hot weather.

Scabies.—Scabies is due to the parasite acorus scabiei. This parasite may spread from some other part of the body. This itch-mite burrows into the skin and gives rise to intense itching, which increases when the body is warm. It is usually due to uncleanliness and coming in contact with uncleanly persons similarly affected.

Crabs.—Pediculi are often found about the external genitals. This is also a parasite, commonly called "the crabs." These parasites localize themselves in the hair, and can be seen clinging to it. They are generally contracted through intercourse with indecent women. Too often husbands thus affected bring them home and innocently cause a similar condition with their wives.

Treatment.—Hot vaginal injections, as advised for diseases of the vagina. Local soothing applications should be made, such as bismuth powder, ten per cent. solution of carbolic acid, benzoated zinc oxide ointment three to four times a day; powdered zinc oxide three to four times a day; acetanilid and chalk equal quantities, three to four times a day; carbolized zinc ointment three times a day, and lycopodium powder several times daily. If scabs are present wash them off with almond or other bland soap, after which apply any of the above ointments. Keep the bowels open daily, resorting to the treatment as advised for constipation.

Accessory Treatment.—If scabies are the cause take a warm bath with free use of soap, followed by dusting the parts with sulphur. Sulphur ointment has been highly recommended.

If due to pediculi, the best treatment is to shave the hair and thoroughly rub in a ten per cent. ointment of oleate of mercury three times a day, or blue ointment four times a day; bichloride of mercury, five grains to a pint of water, bathing the parts several times daily; or carbolic acid solution several times daily.

VAGINISMUS, OR CONTRACTION OF VAGINA.

Vaginismus is a painful spasmodic contraction of the vagina which more or less prevents intercourse.

Causes.—Very frequently due to an extremely sensitive condition of the remnants of the hymen, which will produce violent contraction of the muscles of the vagina. It may also be caused by a fissure of the vagina, erosions of the parts, fissures of the anus and an urethral carbuncle.

Treatment.—If due to a carbuncle it should be taken out, which operation will confine the woman to bed for five to seven days. When due to a thick hymen it will need the attention of a physician. Among the remedies which may be tried at home are injections of a teaspoonful of laudanum to a pint of hot water; an ointment of iodoform; or fifteen to twenty grains of bromide of sodium three to four times a day.

COCCYCODYNIA.

It consists of a very painful condition of the muscles at the very tip of the spine. Is most common in women who have borne children.

Causes.—Injuries during childbirth, blows and falls striking the tip of the spine, cold or exposure of the buttocks, and uterine or ovarian diseases.

Symptoms.—Severe pains in the region of the tip of the spine, increased by motion.

Treatment.—During the acute attacks it may be necessary for a physician to administer hypodermic injections of morphine to relieve the pain. As a rule an operation will be the only treatment to render a complete cure.

URETHRAL CARBUNCLE.

This is a small raspberry-like growth which is very sensitive, and to be found at the mouth of the urethra.

Causes.—These are uncertain. No definite cause has as yet been decided upon.

Symptoms.—It gives rise to severe itching and pain. During urination, as the water runs over it, the pain is more or less excruciating, so marked that women will oftentimes withhold from passing their water until they are further unable to withstand the calls of nature.

Treatment.—An operation is imperative, as no other treatment will afford relief.

DISEASES OF THE VAGINA

ATRESIA OF THE VAGINA.

Causes.—This means an absence of the vagina, or a closure of it. The child may be born this way, in which case it is due to improper development in the womb. Or, as is more frequently the case, it is acquired, due to caustic remedies carelessly applied, a long and tedious labor, extensive ulcerations, and a hymen which does not have an opening.

Symptoms.—In children born with this deformity it is often not noticed until puberty, when the child should menstruate. In fact, menstruation does occur, but owing to the absence of the opening in the hymen it is prevented from escaping and accumulates in the womb. Each month menstrual pains will recur, but there will be a failure of the blood to escape.

Treatment.—This is purely operative.

VAGINITIS.

Vaginitis is an inflammation of the vagina.

Causes.—A rundown system, anemia, systemic conditions producing congestion of the pelvis, such as pregnancy and tumors. May be due to friction produced by a badly fitting pessary, to irritating discharges from the womb, to excessive coition.

Symptoms.—Feeling of heat in the vagina; pain in the pelvis; at times a frequent desire to pass water; itching and burning about the entrance to the vagina; backache; loss of appetite and at times nausea; leucorrhea.

Treatment.—When the inflammation is acute keep quiet, not necessarily in bed. Keep the bowels open, and give a light diet, no meat. If there is much pain use a five-grain opium suppository. If the itching is severe take frequent warm sitz-baths and vaginal douches of hot water containing either of the following: Borax one teaspoonful to the pint, sugar of lead water one teaspoonful to the pint, or half a teaspoonful of creolin to two quarts. These injections should be used several times daily.

MALIGNANT TUMORS OF THE VAGINA.

The vagina may be the seat of cancer. It may begin here, or spread to this canal from the bladder, rectum or womb.

Symptoms.—Cancer usually appears from thirty to forty-five years. The important symptoms are hemorrhage, which often follows straining at stool, or after coition; a foul discharge, which is very repulsive; it may be thick, but as a rule is watery; pain, this is always present, but not as a rule, until after the disease is well developed.

Treatment.—The disease tissue should be removed, of course, by a surgeon. If the disease is well advanced before discovered, as a rule it is too late for operation. If such be the case the indications are to maintain the strength of the patient, relieve the pain and counteract the foul smelling discharge. The first may be accomplished by tonics and out-of-door exercise. These cases, as a rule, are not bedridden until a short time before death. To relieve the pain resort to opium. This is the only drug on which we can rely. Begin with a sixth of a grain four to five times a day, gradually increasing it as needed during the course of the disease. For counteracting the odor of the discharge the best drug to use is perman-

ganate of potash, in a vaginal douche, five grains to two quarts of water. These douches should be used frequently during the day.

Auxiliary Treatment.—A woman suffering from this disease should always wear a napkin, which should be burned as soon as removed from her person. Allow plenty of fresh air to circulate in the room. Those who handle any cloths which come in contact with these discharges should wash their hands at once, using plenty of soap and warm water.

DISEASES OF THE UTERUS OR WOMB

INFLAMMATION OF LINING MEMBRANE OF WOMB (ENDOMETRITIS).

Inflammation of Lining Membrane of Womb.—This is an inflammation of the lining membrane of the womb.

Causes.—Often due to taking cold just before or while menstruating. The introduction of unclean instruments into the womb; the introduction of knitting needles and other instruments by women in an endeavor to produce an abortion. Gonorrhea is oftentimes at the bottom of the trouble. Inflammation of the womb often spreads to this membrane, or the inflammation may begin in this membrane and spread to the womb.

Symptoms.—There is a sensation of weight in the pelvis and slight pain. The discharge is at first profuse, thin and watery, but later becomes thick and tenacious, like the white of an egg. Menstruation may or may not be painful.

Treatment.—During the acute attack rest in bed, with an ice bag over the lower part of the abdomen, or if this is not comfortable, a hot water bag. The bowels should be well moved, preferably by a dose of epsom salts. The diet should consist of liquids, cornstarch, gelatine and the like. Large quantities of hot water should be used as vaginal injections three to four times a day.

Inflammation of the Womb.—A new and effective remedy for this disease consists of a mixture of five ounces of vaseline with three drachms of boracic acid. Make this into fifty suppositories and insert one in the vagina each night on retiring; or, if found more convenient, take a small piece of the mass, about the size of a cherry, and insert as above. This treatment serves also to correct irregularity of the menses. Hot water injections daily.

INFLAMMATION OF THE WALLS OF WOMB (METRITIS).

Inflammation of Walls of Womb.—Metritis is an inflammation of the muscular walls of the womb.

Causes.—The most frequent cause is getting out of bed too soon after a confinement; abortions; exposure to cold during menstruation will give rise to it, also sexual excesses and lacerations of the womb.

Symptoms.—The acute attacks usually begin with a chill, generally followed by a fever. Pain is more or less marked, and may extend down the legs, and be especially troublesome on the left side of the abdomen over the ovary. The monthly flow is apt to be accompanied by a great deal of pain.

Treatment.—The treatment is the same as endometritis.

FIBROUS TUMORS OF THE UTERUS.

Symptoms.—They give rise to pain, more or less severe at times, and to hemorrhages, which may cause death. The pain is especially severe during the menstrual period. The hemorrhages may occur several times between the monthly periods, or the monthly period itself may last for a week to ten days.

Treatment.—For the pain, morphine as a rule is the only drug which affords relief, one-sixth to one-fourth of a grain every four hours. Tincture of gelsemium, ten drops every three hours, may prove of service. For the bleeding try a teaspoonful of the fluid extract of hydrastis every three hours, or a teaspoonful of the fluid extract of ergot every four hours. If drugs fail to control the hemorrhage it may be necessary to pack the vagina with gauze, which pressing against the womb usually controls it.

The following is a very good prescription, which should be tried in all cases of bleeding from the womb:

R.—Extract of hydrastis fluid (colorless)..... 1 ounce
Extract of hamamelis fluid ..... 1 ounce
Extract of ergot fluid ..... ½ ounce
Peppermint water, to make..... 3 ounces
M. Sig.—Teaspoonful every four hours.

Or, thyroides, one drachm. Make thirty capsules, one three times a day. Very often the fibroid can be removed with complete success.

POLYPUS TUMOR OF THE WOMB.

Character.—This disease, which is one of the most common causes of excessive hemorrhage from the womb at the monthly periods, is of considerable importance. The term polypus is employed to designate especially a tumor which is attached to the inner surface of the womb by a well defined neck or pedicle.

Symptoms.—The most important is profuse menstruation. After a time, as the tumor grows larger, and becomes more of an irritant, there are likewise frequent discharges of blood between the periods, often amounting to attacks of flooding. There is also a leucorrheal discharge which may be tinged with blood. Occasionally there are paroxysms of pain.

Treatment.—Unless the tumor is removed the case is hopeless. The operation simply consists in twisting the polypus off of its pedicle or neck. The patient is required to stay in bed ten days to two weeks.

ULCERATION OF THE WOMB.

Cause.—In a majority of cases inflammation of the neck of the womb is soon followed by ulceration. This appears around the neck of the womb, and just within the womb's neck.

Symptoms.—1. The inflammations and ulcerations mix and run into each other, resulting in raw places, granulations or pimply surfaces, and hardened parts. Sometimes the pimply patches become red and hard, the whole surface spongy, and bleeding will set in on the slightest touch.

2. As ulceration progresses it wrecks the mouth of the womb and eats deeply into the womb cavity, giving it an unsightly appearance. Pus or matter flows freely at times and at other times scantily. It may be thick and yellow, or thin and of lighter color. A sensation of heat and smarting exists and sometimes severe pain in the right side of the abdomen and in the back part of the head.

Menstruation.—Ulceration generally changes the character of the menstruation. Sometimes it becomes profuse and painful, at others scanty; and then it may be either frequent or tardy, giving rise to distress and pain in the lower part of the bowels and even in the groins and thighs.

Treatment.—1. A tea made of the white pond lily affords an excellent remedy. It should be used internally and as an injection; in the former case in doses of half a teacupful three times daily. The fluid ex-

tract may be used in place of the tea in ten- or fifteen-drop doses twice a day.

2. Tannic acid, or in place of it a decoction of oak bark, used as an injection night and morning, gives excellent results.

3. The application of tannic acid directly to the ulcers has effected many cures.

4. Half a teaspoonful of boracic acid to a pint of water, injected when warm, and repeated twice a day, is a highly recommended remedy.

5. A decoction of golden seal used twice a day as an injection has been found to give satisfactory relief.

Accessory Treatment.—Where injections are depended upon, their virtue can be increased by simple injections of warm water between times, and as often as every two or three hours.

CANCER OF THE WOMB.

Character.—The womb is the one part of a woman's body most frequently attacked by cancer. The disease may begin in the neck or the body of the womb. When situated in the neck of the womb it looks not unlike a cauliflower, hence the term "cauliflower cancer."

Causes.—It is more frequent among the whites. The lower classes are more susceptible than the upper. It is extremely rare that a woman who has not borne a child is ever affected with cancer of the womb. In unmarried women who have had cancer of this organ the confession of an abortion has often been elicited, showing that pregnancy had occurred. As a rule a badly-lacerated cervix (neck of the womb) is very prone to cancer, the disease invariably starting in such a state of affairs.

Heredity plays a more or less important rôle, especially when cancer existed in the mother, or the mother's side of the family.

Symptoms.—In the very early stages they are absent. As the disease progresses the following will appear: 1. Hemorrhages. 2. Uterine discharges. 3. Pain. 4. Visceral disorders. 5. Cachexia.

Hemorrhage.—This is usually the first symptom, and is generally due to ulceration and breaking down of the parts. Unfortunately it is attributed to the irregularities of the menopause, or to a return of the monthly flow after that period. Hence it is the bleeding of cancer is very often disregarded until it has progressed beyond the hope of a cure. The reappearance of hemorrhage two or three years after the menopause is strong proof of cancer and should receive immediate attention.

Examination.—Every woman who has passed the fortieth year, and has vaginal bleeding, or leucorrheal discharge mixed with blood, should at once consult a physician and insist upon an examination being made. Too often women through a mock modesty or for other reasons refuse to have an examination, and this stubbornness has cost many a woman her life. The symptoms of many of the diseases of the womb and ovaries are similar, and it requires a thorough examination, at times under an anesthetic, in order to ascertain the true condition of the pelvic organs.

Pain.—This does not appear early, but late in the disease, as a rule too late for an operation. As the disease progresses the pain will spread over the entire portion of the lower abdomen, especially so when the bladder and rectum become involved; the pain is excruciating and intolerable. This torture is constant and does not ease of its own account. A woman suffering from cancer of the womb truly does live a hell upon earth.

Visceral Disorders.—These are generally due to the extension of the disease, or to the pressure of the womb on the surrounding organs. The bladder becomes very irritable, there is a constant desire to pass urine, and the patient will strain and strain in an endeavor to squeeze out a few drops in order to obtain a little relief. As the ulceration progresses fistulæ may develop, the openings extending into the womb, the bowels or the rectum. Constipation becomes very troublesome.

Cachexia.—This is a characteristic symptom; and appears several weeks after the onset of the disease. It consists of a peculiar yellowish discoloration of the skin of the entire body. It is marked by emaciation, and the patient may waste away to "skin and bones."

Treatment.—If seen early and the disease is limited to the womb, this organ should be removed at once. If the disease does not return in three years then the woman is fairly safe. But if the disease is not limited to the womb and has spread into the surrounding structures, and an operation be performed, the cancer is very liable, and invariably does, return.

Use of Morphine.—If the woman refuses operation, or should an operation be performed and the disease return, there is only one drug that will ease the pain, and that is morphine. The patient must practically be kept under its influence. In short, she becomes an opium fiend, not through choice, but from necessity. This drug may be given, one-quarter of a grain three to four times daily, increasing the dose as required; but always by the advice of a physician.

Checking the Hemorrhage.—If the hemorrhage becomes troublesome it may be necessary to curet the womb in order to control it. Drugs have little or no effect on it. Packing the vagina with antiseptic gauze will at times prove beneficial.

Injections.—The discharge must be attacked with might and main. For this purpose resort entirely to vaginal injections, using permanganate of potassium, seven grains to two quarts of water, three to four times daily; bichloride of mercury, same strength and as often. These douches at times weaken the patient; in that case probably two a day will be sufficient, but never less than this. The odor of the room may be very disagreeable. In order to counteract this place around the floor in saucers, pure carbolic acid, and air the room as often as possible.

DISPLACEMENTS OF THE WOMB.

Character.—The womb, like every other organ of the body, is subject to deviation from its normal position. The womb is situated in the pelvis between the bladder and the rectum. The bladder is attached to the front of the neck of the womb while the rectum is very close to, but not intimately attached to the back of the womb.

When the womb becomes displaced the whole organ may turn forward (anteversion), or backward (retroversion). Or the womb may bend on itself. If the top of the womb falls forward then it is called anteflexion, or if it should fall backward then it would be retroflexion.

The symptoms and causes of the displacements vary more in degree than kind.

FORWARD DISPLACEMENTS.

Causes.—The most frequent causes are changes in the uterine tissues, following an abortion or confinement. Lack of proper muscular support plays an important part, also congestions, tumors, lacerations of the pelvic floor, tightly fitting clothing, and prolapse of the vagina.

Symptoms.—Dysmenorrhea and sterility are frequently present. Leucorrhea may be troublesome. When the displacement is so great that the womb presses on the bladder, this organ will become irritated, causing frequent irritation, and a more or less constant distress in the lower part of the abdomen. This irritation may give rise to inflammation of the bladder.

Treatment.—If the menstruation is painful use the remedies as described for dysmenorrhea. For the leucorrhea, employ the remedies advised for that condition. If inflammation be present local treatments with

he hot vaginal douches are to be employed. If a tumor is the cause it should be removed. The ideal treatment is to replace the organ.

BACKWARD DISPLACEMENTS.

These include retroversion and retroflexion. These are the most frequent varieties, and are more or less easily controlled.

Causes.—General lack of muscular tone of the uterine muscles, improper care during confinement, wearing a tight binder too long after being confined, tumors, pregnancy, falls, blows, distended bladder and lacerations of the perineum.

Symptoms.—Painful menstruation, as a rule, the first day or two of the flow, frequent miscarriages, leucorrhea, constant dull aching pain in the small of the back, dragging pains in the lower portion of the abdomen and thighs, headache, constipation, the bowel movements are at times painful, the bladder may be irritable, and at times the urine may escape when the woman laughs heartily.

Treatment.—1. First of all the organ must be replaced in its normal position. If not fastened down by inflammation a physician can replace it; at times an anesthetic may be required. After the organ is replaced the physician will introduce a pessary to keep it in its normal position. A pessary is a rubber ring of various shapes. This instrument should be removed at least once a month, cleansed and replaced. While the pessary is in the vagina use a douche of lukewarm water once a day. If the pessary feels uncomfortable, or is painful on getting up or sitting down, it should be taken out and replaced; if still giving rise to trouble, it is in all probability too large, and a smaller one should be tried.

2. If inflammation exists, this is to be cured by local treatments and hot vaginal douches. For the leucorrhea, see description of that condition. For constipation, see constipation.

3. If the pessary maintains the uterus in its normal position, and relieves all the symptoms, then it is optional with the patient whether or not she will submit to an operation. If, however, the local treatments, and all other remedies fail to afford relief, then it will become necessary to open the abdomen, and perform one of the many operations for sewing the womb in its proper position.

4. If the uterus is fastened down by inflammation, local treatments will do no good, and an operation will be the only proper treatment.

PROLAPSUS (FALLING) OF THE WOMB.

Prolapsus of the womb is a descent of the organ below its proper position in the pelvis, better known as "falling of the womb," and may occur in two different degrees. The term prolapsus is applied to any falling downward of the organ, which is not so great that the womb passes outside the body; whilst the latter, called procidentia, is that condition in which the uterus escapes partially or entirely beyond the external organs of generation.

Causes.—Falling of the womb is more apt to occur after maturity is attained, and appears especially in those who have led laborious lives, or who have exercised themselves too much in lifting or carrying heavy weights. Hence cooks, laundresses, market-women and nurses, who lift and carry large and heavy infants, are especially liable to suffer from prolapsus. Women who have borne children are more frequently affected than those who are sterile, and lingering or instrumental labors, or getting up too soon after confinement, particularly predispose to it. Among the direct causes may be found congestion, hypertrophy or tumors of the uterus. Violent bearing-down efforts in labor, straining in obstinate constipation and forced respirations, such as occur in coughing, lifting heavy weights, and so forth, are also direct causes of falling of the uterus.

Symptoms.—The symptoms of this complaint are sensations of fullness and weight about the pelvis, wearisome backache, and leucorrhea. Menstruation is not usually interfered with and obstinate constipation is very common.

As the prolapse increases the bladder will be pulled down, which will interfere with its functions; such as frequent desire to void urine, the inability to completely empty it each time, resulting in an inflammation of its mucous membrane. The rectum will be dragged down in the same manner, giving rise to more or less difficulty in the bowel movements.

Treatment.—In the first stage, consists in the employment of a pessary to hold the womb up to its proper level. If the perineum is lacerated, this must be repaired, otherwise a pessary will drop out. The only satisfactory treatment for this condition, especially when the womb hangs out, is an operation, which consists in amputating the neck of the womb, sewing up the lacerations of the perineum, and opening the abdomen in order to stitch the womb where it belongs. Nothing else will afford relief.

This condition too often generates cancer of the womb, and if the women so affected would only consent to have this operation done they will be free from all the symptoms caused by this displacement, and oftentimes will be fortunate enough to prevent a cancerous growth of these parts.

DISEASES OF THE OVIDUCTS.

The oviducts are two tubes, one on each side of the womb, and convey the egg from the ovary into the uterine cavity each month. These ducts are subjected to inflammatory disease, which may terminate in a good recovery or develop into an abscess.

Salpingitis.—This is an inflammation of the oviduct. It may effect one or both sides.

Causes.—Usually due to gonorrhea, or poisoning following labor, catching cold during the menstrual period, and excessive exercise. A cause usually overlooked is disrobing and lying down in a draught after a prolonged exercise, when the body is very much overheated.

Symptoms.—This disease may be acute or chronic. During the acute stage there will be fever, a great deal of pain on the side of the inflamed tube. This pain is increased on walking or standing. The patient while lying on her back prefers to have the knees drawn up and the lower part of the abdomen is extremely sensitive.

During the chronic stage there is pain in the affected side, which is increased on walking, running up and down stairs, intercourse and sweeping. Menstruation as a rule is painful, coming on a few days before the flow.

Treatment.—Rest in bed during the acute attacks, and thorough purgation of the bowels. Copious hot water vaginal douches, at least twice a day. Ice bags over the lower portion of the abdomen are highly recommended.

DISEASES OF THE OVARIES.

The ovary may be attacked by inflammation, which may or may not form an abscess, tumors, benign and malignant, which may be solid or cystic.

Ovaritis.—By this is meant an inflammation of the ovary.

Cause.—A frequent cause in young girls is too close confinement in school, at work or overstudy. May be due to blood poisoning following a miscarriage or confinement, to gonorrhea, inflammation of the womb, salpingitis and using a cold instead of a hot vaginal douche, standing in

a draught after being overheated, or while the body is in an overheated condition, jumping into a very cold bath.

Symptoms.—The pain is excruciating, and is situated low down in the abdomen, near the groin; this pain oftentimes shoots down the leg of the affected side. The pain may extend into the back and hip. The lower part of the abdomen is extremely sensitive, and the sufferer will not permit anyone to touch it. Even the weight of the bed clothing may give rise to so much distress that a prop will be necessary in order to prevent the bed-clothing coming in contact with the skin. Fever will be present, the height of which will depend on the severity of the attack. Voiding urine, and the bowel movements may be accompanied by more or less pain. These symptoms occur during an acute attack.

Treatment.—During the acute attack rest in bed is imperative. An ice bag should be applied over the affected ovary, providing the skin is not too sensitive to stand it. If this is not well borne, try a hot water bag, or flaxseed poultice. In addition to these, which always tend to ease the pain, opium should be given by the mouth or with a hypodermic needle. When the pain is so great as to demand opium, of course only a physician should prescribe it.

Accessory Treatment.—At times any of the following drugs may afford relief. Antipyrine, five grains every three hours; acetanilide four grains every three to four hours; or the two combined, giving two grains of each every three hours; or the tincture of gelsemium ten drops every three to four hours, in a teaspoonful of water; for reducing the fever tincture of aconite one drop every hour. The following prescription is often of value in all varieties of inflammation of the ovary, irrespective of the cause:

R.—Tincture of gelsemium ..... 2 drachms
Tincture of cannabis indica ..... 2 drachms
Peppermint water ..... 3 ounces
One teaspoonful, repeat in two hours, then every three hours.

When the inflammation becomes chronic, local treatments should be persevered in for several weeks; combined with hot vaginal injections. If there be leucorrhea use the remedies advocated under that heading.

If the local treatments do not afford relief then it will be necessary to have an operation, which will consist in removing the ovary if badly diseased, or if slightly so then only that portion which is affected.

Pyosalpinx.—If an acute attack of ovaritis does not get well, or

develops into a chronic condition, and pus forms, then it is called pyosalpinx, which means pus in the tube or oviduct.

Symptoms.—They will be those of ovaritis, only more so. Chills may also be present, due to the absorption of the poisonous material from the pus.

Treatment.—This consists in the removal of the ovary and tube, as no other procedure will effect a cure. Too often women suffering from this condition will delay operation until the last possible moment, which delay invariably costs their life.

Displacement of the Ovary.—The ovary may drop down from its normal position, in so doing it always falls back of the womb. This is called prolapsus of the ovary.

Prolapsus of the Ovary—Causes.—Generally due to enlargement of the ovary, which may be caused by inflammation or tumors. A sudden fall or misstep will at times cause an ovary of normal size to fall downward, which will invariably become inflamed.

Symptoms.—Pain located deep down in the pelvis, which may be of a dull aching character, or sharp and shooting. The bowel movements are frequently painful, due to the distended rectum pressing against the ovary. Intercourse is very painful and may be accompanied by nausea.

Treatment.—Local treatments and the use of the hot vaginal douche may afford some relief, but invariably it is necessary to remove the ovary, which operation will require a rest in bed of three to four weeks.

TUMORS OF THE OVARY.

The tumors of the ovary may be solid or cystic. The former may be benign or malignant. The solid tumors are divided into the fibrous, muscular and cancerous, the latter of which is extremely rare.

Cystic Tumors of the Ovary.—These cysts are divided in the small and large. The former attain the size of an egg or the fist, while the latter may grow to any size, holding many gallons of liquid.

Causes.—The immediate cause is very obscure; usually due to inflammation of the ovary, sudden amenorrhea, excessive intercourse and blows on the abdomen. These tumors may be present at any age, from infancy to advanced old age, but are most common during the period of sexual activity, between the twentieth and fortieth years. Strange to say they are most frequent in the unmarried woman and those who have not borne children.

Symptoms.—1. The woman may first notice that one side of the abdomen is larger than the other, and later on will be able to feel a lump on that side. This may increase rapidly in size, the whole abdomen becoming distended, and looking not unlike pregnancy. Indeed, the woman herself may suspect that she is pregnant. Later on, there will be a sensation of weight in the pelvis, the bowel movements will be painful and the bladder very irritable, due to the pressure of the tumor. Painful and profuse menstruation is of frequent occurrence.

2. As the tumor increases in size there will be pressure symptoms, swelling of the legs, due to pressure on the blood-vessels, the privates may become swollen, due to the pressure on their blood supply; when the tumor becomes sufficiently large to press on or near the diaphragm there will occur shortness of breath. Besides these the face will have a pinched expression, characteristic of this kind of tumor; there will be marked loss of weight and general debility.

3. Pain more or less constant will be present, and at times violent in character. This may be due to peritonitis, caused by the irritation of the tumor.

Treatment.—1. The only cure is, of course, operation. If the cysts are very small, about the size of a pea, they can be removed from the ovary, and this organ allowed to remain. But, on the other hand, if they are the size of a pigeon's egg or larger, then it will be necessary to remove the ovary with the tumor.

2. The old method of tapping the cyst and drawing off its contents is to be condemned as dangerous.

3. The operation of ovariotomy, or removal of the ovary, will necessitate the patient remaining in bed three to four weeks.

LACERATIONS OF THE PERINEUM.

Character.—This consists of tears of the anterior and posterior walls of the vagina, during childbirth. The laceration may extend through the posterior vaginal wall into the perineal body.

Symptoms.—1. When the anterior or front wall of the vagina becomes torn the support of the bladder is usually disturbed, and there will be more or less trouble in voiding urine. In addition there will be an inability to entirely empty the bladder each time, which may result in inflammation of the bladder.

2. When the posterior or back wall of the vagina is torn the

symptoms are more marked. This laceration as a rule extends through the muscle which is the main support of the womb from below, by holding up the pelvic floor, and in this way supporting the womb. These muscles are two in number, one on either side.

Treatment.—1. After labor the parts should be thoroughly inspected to see if a laceration has occurred. If so it should be sewed up at the time. When a physician tells a woman that she is torn—and it is no fault of his that such does happen—and desires to insert stitches, she should allow him to do so. Too often women will not permit it, and they regret it only once, and that is as long as they live.

2. If the tears are sewed right after the baby is born they will invariably heal and the parts will be restored to the same condition they were in prior to labor. If not the muscles and tissues do not heal together, and the woman will begin to suffer from all kinds of pelvic symptoms, such as forward and backward displacements of the womb, prolapse of this organ, prolapse of the bladder and obstinate constipation.

3. These lacerations are divided into complete and incomplete. The first consists of those in which the tear extends through the bowel, the latter a tear of any extent near, or down to, but not through the bowel. If these lacerations are not repaired at the time, then it will only be a question of time before such an operation will be necessary, so why not permit the physician to do as he thinks best at the time these lacerations occur.

4. If the laceration is complete there will be a loss of control of the bowels, and they will move without the knowledge of the woman. If the tears are not repaired at the time, it is useless to attempt it less than three months after labor, if so a poor result will usually be obtained.

GONORRHEA.

Character.—This is an inflammatory disease commonly called "the clap." Greater than any other danger, presented to woman, is sexual intercourse with a man who has gonorrhea or syphilis; the former is the more destructive. The attack of gonorrhea in the male at the time of intercourse may be acute, chronic, or one which had not been thoroughly cured.

A Serious Disease.—While gonorrhea in man in most cases is a trifling disorder, although there are exceptions in which it leaves a serious condition or becomes fatal, are not so very rare; in woman it is one of the most serious diseases.

Many an innocent and previously healthy woman, shortly after marriage to a man who supposed himself to have been cured of gonorrhea years before, may get a destructive gonorrheal infection.

Diseases Induced by Gonorrhea.—When we take into consideration that a gonorrheal infection in a woman may cause inflammation of the vulva, vagina, urethra, bladder, lining membrane of the womb, the womb itself, the tubes and the ovaries; that the inflammation of the tubes and ovaries as a rule result in abscesses, nay more, that too often both ovaries have to be removed, and oftentimes the womb with it, then you will realize the dangers of an attack of this disease in a woman.

Causes.—They have been mentioned, intercourse with a man who has had an attack of gonorrhea, or is still suffering from an old attack which has not been thoroughly cured, and yet his physician has probably discharged him as "cured." Very frequently you will hear a person say that it was contracted from a water closet; this is impossible, especially with a man, but, a woman, under very rare circumstances, may come in contact with pus which has escaped from the male on to the seat of the closet. I have never heard of such an instance happening; although it is possible it is extremely improbable.

Symptoms.—1. These consist first, of a burning and itching sensation in the "privates," followed in a day or two by a discharge, which in a few days generally becomes profuse. The pain in these parts then becomes more or less unbearable. Each time the bladder is emptied there is a burning, scalding sensation, due to the urine flowing over the inflamed parts.

2. If the inflammation spreads to the urethra and bladder there will be all the symptoms of cystitis (which see). If the disease extends to the uterus there will be all the symptoms of acute inflammation of the womb, which will necessitate the woman going to bed. As the disease spreads to the tubes and ovaries the pain in the lower part of the abdomen will become intense and the fever increase; both of which will become intensified if abscesses form.

Treatment.—This consists in vaginal injections of permanganate of potash, five grains to a quart of hot water four times daily; bichloride of mercury, seven and one-half grains to the quart, same as before; or applications to the vagina of nitrate of silver, thirty to forty grains to the ounce of water. The latter should be done by a physician. A woman who has the symptoms first mentioned may at once suspect she has gonor-

rhea, and should consult a physician immediately and place herself under his care.

DISEASES OF THE BLADDER.

The bladder may be irritable and yet not inflamed, so a special description will be made.

Irritability of the Bladder.—This may arise from purely functional causes and is of frequent occurrence in nervous women. Oftentimes present in diseases of the womb and vagina, and when the front wall of the vagina has been lacerated. Also present in displacements of the womb. It may follow abdominal operations and parturition (childbirth).

Symptoms.—Similar to those of cystitis. The urine from an irritable bladder is always clear, never contains pus.

Treatment.—Build up the constitution by the use of tonics. (See Anemia.) Regulate the bowels. The following may be tried:

R.—Atropine sulphate ..... ½ grain
Distilled water ..... 4 ounces
Five drops in water after meals.

If the woman is extremely nervous, fifteen grains of the bromide of potassium or sodium every four hours will prove of value.

Cystitis.—This is an inflammation of the mucous membrane of the bladder and may be acute or chronic.

Causes.—Acute cystitis may be caused by exposure to cold; gonorrhea; dirty instruments, particularly a catheter; pressure of the child during labor; inflammation of the peritoneum or pelvic organs; blows and falls when the bladder is distended with urine, and the improper use of certain drugs.

Chronic cystitis may be a continuation of the acute form, especially by pressure of the uterus during pregnancy, or large tumors.

Symptoms.—1. The acute form frequently begins with a chill, followed by fever, which is not very high. There is considerable pain in the lower portion of the abdomen, difficult and painful urination, and the urine is very cloudy. The desire to urinate at night may be very troublesome, and is apt to become more or less constant. There is a continuous feeling of pressure and weight over the bladder.

2. In the chronic condition the pain is not so severe, but constant desire to pass water, especially at night, is very distressing. When there is a desire to pass water the patient must go at once, being unable to hold

her water. If she should lift heavy weights or cough the water may dribble away.

Treatment.—1. All instruments that are introduced into the bladder should be thoroughly cleansed and rendered antiseptic.

The acute form is best treated by rest in bed and an ice bag over the bladder. If the latter is not tolerated, then try a hot water bag. A very good drink is flaxseed tea. If the pain is severe, one-half grain of opium suppository will afford relief, repeating in about three hours if necessary. The following prescription will be found very useful:

R.—Tincture of aconite ..... 1 drachm
Sweet spirits of nitre ..... 1 ounce
Liquor potassii citratis ..... 6 ounces
A dessertspoonful every four hours.

All alcoholic liquors must be restricted, and the diet should consist of milk and broths.

2. If the disease becomes chronic the patient should be kept on a bland diet. Vegetables, such as asparagus and those containing salts, and all alcoholic liquors should be prohibited.

3. If the urine is highly acid it should be rendered neutral by the benzoate of sodium; if it is alkaline, it should be rendered less irritating by the acetate or citrate of potassium.

4. Salol, five grains, four times a day is an excellent drug for this condition. Mineral waters such as Bethesda, Vichy and Buffalo Lithia are to be taken, at least several glassfuls a day.

5. Great relief is afforded by washing out the bladder, of course this can be done only by a physician.

6. If the water constantly dribbles away, it may be cured by stretching the neck of the bladder. This will necessitate remaining in bed for about a week.

Stone.—Stone in the bladder of course requires an operation for its removal. There is a prevalent idea that a stone in the bladder can be dissolved by medicines and lithia water. This is a false impression and a great many quacks take advantage of it, generally to extort money from the sufferer.

DISEASES OF THE FEMALE BREAST

The breast is subject to inflammation, abscesses and tumors.

MASTITIS OR MAMMITIS, INFLAMMATION OF THE BREAST.

Causes.—This may be produced by blows on the breast, or to any of the usual causes of inflammation. It may occur at any age, and in either sex. An acute attack is more often found present in nursing women during the first week or month after delivery. If such happens it is invariably due to cracked nipples.

Symptoms.—At first only an uneasiness of the breast is noticed, then a chill occurs which is usually followed by fever. The gland becomes intensely swollen, red and exceedingly painful. The inflammation may be so great as to cause an abscess.

Treatment.—This consists in preventing an abscess from forming. To accomplish this wash the nipples thoroughly three to four times a day, and stop the baby nursing the affected breast. The breast should be emptied of milk, by the cautious use of the breast pump. Cloths saturated in a solution of lead water and laudanum should be applied several times a day, and over these lay an ice bag, or rub frequently with hot lard.

ABSCESS OF THE BREAST.

If the inflammation does not subside an abscess invariably results.

Treatment.—1. If it appears that pus is forming hot applications should be made, preferably flaxseed poultices, to be renewed as soon as they become cooled.

2. As soon as pus is detected the breast should be incised and the cavity drained.

3. Too often women refuse to allow their physician to lance the breast, thinking it will come to a head and be well in a few days. This is a great mistake. The breast should be freely opened, in order that the pus can easily run out. If necessary an anesthetic should be taken, in order that the physician may accomplish thorough work. At times it may be necessary to insert a drainage tube; depending entirely upon the time which has elapsed from the formation of the pus until the time it is incised.

TUMORS OF THE BREAST.

These may be benign or malignant. Tumors of the former type can be readily removed, and will not give rise to further trouble. On the other hand, those of the latter class, which are of a cancerous nature, are very apt to return, unless operated on early and thoroughly.

CANCER OF THE BREAST.

Character.—Very often a woman will strike her breast against a hard object, or may be struck by a fist. This blow may be followed by a lump, which in a few days may disappear.

Again, a woman while dressing may notice a lump in the breast, and think nothing further about it, or may try to cure it by rubbing in camphorated oil, or other household liniments.

These lumps frequently are the early stages of cancer, and the longer the delay the greater the risk. When a woman discovers a lump in the breast she should consult a physician at once in order that he may properly treat and watch it. If the lump continues to grow and remains hard then he will, or rather should, advise an operation. Under such circumstances these lumps are invariably a beginning cancer.

Treatment.—If the lump is small then it may not be necessary to remove the entire muscles, but simply the breast. On the other hand, if the lump is large and of long standing, or if the breast is immovable, that is, cannot be moved from side to side, then the breast, muscles and all surrounding tissue will demand removal. Recurrence may follow. Many women can be cured of cancer of the breast, providing they will consult a good physician early, which is, as soon as a lump is noticed; and if such does not become smaller or disappear in two weeks, submit at once to an operation or the application of the X-ray.

Beware of Quacks.—It is surprising the number of women who will scorn the advice of a physician, and place themselves under the care of a charlatan or a quack. This class has killed more women than any of the most malignant of diseases, and yet the State will sanction their existence. Beware of quacks, especially when a cancer exists. These deceivers and money extortionists advertise to remove these growths by the "roots." Such growths have no roots. And yet how many women will stand the torture of the acids which they apply to eat out the tumor, in preference to a clean-cut operation, under an anesthetic, which will keep them in bed

only two weeks. While the "eating out the roots" process requires a torture of several weeks.

SOME INTERESTING FACTS OF GREAT VALUE TO WOMEN

Preventing Disease.—Education has a great influence in the development of diseases peculiar to women. During early childhood, when the pelvic organs are undergoing their development, the child must not be confined to the house and at school all day. She should be allowed as many hours recreation a day as feasible, in order that she may enjoy out-door exercise, and obtain all the fresh air possible, which is of so vital importance to her constitution. Too long daily practice at the piano or organ is also harmful.

What to Avoid.—Everything that causes an increase of blood to the womb and ovaries should be avoided. In this category belong sexual excitement brought on by reading suggestive novels; by looking at obscene pictures; by masturbation (self-abuse); sodomy and even normal coition if performed too violently.

Care of the Skin.—The care of the skin is of great importance. Baths, daily or two or three times a week, should be encouraged. The accumulation of dirt blocks up the sweat glands, and nature is unable to throw off the impurities through these vessels. The Jewesses from Russian Poland are very susceptible to disease, and their appearance conveys to one the idea that they never wash their bodies.

Overwork.—All work and no play is a fruitful cause of ill health. Every woman who has the cares of a household should indulge in open-air exercise, or daily walks. Golf, horseback riding, walks, gathering flowers and the like, are to be highly commended, because they combine exercise with open air.

Proper Food.—There is room for improvement regarding food. Many girls have a loathing for food in the morning, and often take nothing but a cup of coffee, and at times not even that, and go to school, and allow their brains to work for hours on an empty stomach. Such a practice is to be condemned in the strongest terms. It is not only a very bad habit, but it spoils the appetite, tends to cause a sour stomach, and impoverishes the blood, which leads to nervous disturbances. The same may be said of candy, the immoderate use of which among girls and women corresponds to alcoholic beverages and tobacco in men.

Mode of Dressing.—Some few suggestions regarding the mode of

dressing may be of value. One of the most frequent causes of congestion of the pelvis is the "decollete" evening dress and the bell-shaped nether garments. High heels, when worn at an early age are apt to change the normal inclination of the pelvis, a cause of tedious and difficult labors.

Tight Lacing.—Of much more importance is the use of the corset. A loose corset at the best is more or less binding. Tight lacing, of course, should be avoided, it displaces the various organs in the abdomen, pushing them in all directions, excepting the normal, and causes a crowding down of the pelvic organs, hence a fruitful cause of diseases of women.

The Menstrual Period.—Neglect during menstruation is one of the most fruitful causes of female diseases. Dancing and skating during this period should not be permitted. Sexual intercourse at this time, to say the least, is a repulsive habit, yet it is not of rare occurrence. Such a practice is very apt to result in a pyosalpinx (abscess of the oviduct, which see).

Marriage with Disease.—Marriage with existing disease of the pelvic organs is a frequent cause of unhappiness for both husband and wife. Disease of such organs may prove destructive of all sexual desire or may prevent the possibility of conception. But if these should not ensue, there still remains the greater and more appalling danger of defective child development in the womb, or of the actual transmission of disease to offspring. Such calamities are all too frequent, and those who would enter the marriage estate should feel certain that their pelvic organs are free from diseased conditions.

Evil of Abortions.—Abortions, however brought about, play their part in causing inflammatory and nervous wrecks of women. They are the source of many serious and, ofttimes, permanent diseases. Causes of abortion are very numerous. Among those most common are displacement of the womb, ulceration of the neck of the womb, too much exercise, heavy lifting jar from a slip or fall, strong emetics, powerful purging, etc.

Treatment of Abortion.—If the symptoms are slight, it may be that nothing more than a few days' rest will be required, keeping the body as much as possible in a horizontal position, taking occasional cooling drinks, and at bedtime a pill composed of one grain of camphor and two grains of sugar of lead. In addition, a mustard plaster may be applied to the lower part of the back to allay any pain that may be experienced. If the conditions are severe, and flooding should set in, accompanied with marked symptoms of miscarriage, a napkin wetted with cold water, or vinegar and water, should be laid upon the external genitals. Rest in bed is important.

If the symptoms are not thus allayed, recourse must be had to the plugging of the vagina with pieces of cloths soaked in a solution of alum or tannin; fill the vagina full and then place a fold of linen in the genital fissure and apply a bandage. Remove the plug in from five to ten hours and replace if the discharge continues.

Conception.—Every young couple intending to enter the marriage relation should know what a terrible curse they are liable to transmit to their future children through ignorance of the vital principles which regulate reproduction. This attended to, it then remains with the mother to mold the infant growing within her by being herself at the time what she would like her child to be.

The physical obstacles to conception are chiefly those diseases which have been previously described. When it is dependent on the causes which produce painful menstruation, or profuse menstruation, or a suppression of menstruation, the remedies are the same as are pointed out for those complaints. If inflammation of the ovaries be the cause, a cure may be effected, provided the inflamed condition be removed. If inflammation or ulceration of the neck of the womb be the obstacle, the remedy may be found in the treatment recommended for these affections.

CHANGE OF LIFE (MENOPAUSE).

This is better known as the "change of life," also called the climateric.

Time and Character.—It comes on gradually, extending over a period of three to four years; it comprises the times when the monthly flow begins to be irregular, gradually diminishes and ceases altogether. As a rule in most women it begins about the age of forty-five, but invariably so between forty-five and fifty years. Those who menstruate early continue to menstruate longer than those who begin late, hence have a late menopause. Those who suffer from a chronic inflammation of the womb or are weakened by severe uterine hemorrhages begin to change life sooner than a healthy woman.

When the menopause comes on gradually the woman is not very liable to have severe disturbances, but if it comes on abruptly the discomforts are very bad, and the general strain of symptoms are marked.

Dangers of the Period.—This period is a critical point of a woman's life. Too often women while passing through this stage pay little attention to it, and every bad symptom is attributed to the "change of life."

This is the time of all others that cancer of the womb and breast is prone to develop. Every woman with a lump in her breast, which develops during this period, should consult a physician at once. When ever bleeding takes place from the vagina, after the menopause has ended, invariably signifies beginning cancer, and the woman should immediately submit to an examination.

Symptoms.—1. The first symptom of the menopause is irregularity in the menstrual flow, as regards the time and quantity. The intervals between the menstrual periods will become extended, say every five to six, seven or eight weeks. Sometimes, on the contrary, menstruation becomes more frequent. The periods last longer, say six to eight days. There will be congestion of the head, causing a red face, headache and indistinct vision, buzzing in the head and ears, dizziness, the sleep is disturbed by dreams, and at the time the flow should occur may have bleeding of the nose.

2. Besides the above, there may be catarrh of the stomach and intestines; congestion of the liver, rendering it torpid; the kidney disturbances generally appear in the form of a sediment in the urine. Leucorrhea may be very troublesome. An eruption of the skin of the face may occur, and there may be intense itching, burning or smarting sensations all over the body. The vulva may be the seat of most distressing itching.

3. A very disagreeable feature of the "change" is the fever and sweats; this consists in a rush of blood to the head, the body becomes very warm and then breaks out into profuse perspiration. This may occur at any time and place. When others think the room very cool, she will think it exceedingly warm.

4. The heart is often affected in the form of palpitations and shortness of breath. The nervous system also shows evidences of a general upset. Sometimes the limbs become very trembly. The temper is subject to great changes, and the sexual appetite may be greatly increased. She may become delirious, or even go insane.

5. The organs of generation undergo marked changes. The uterus, vagina, vulva, ovaries and breast all shrink and become greatly reduced in size.

Treatment.—1. Although this is a perfectly natural process, which is of normal occurrence in every woman's life, conditions will arise demanding interference.

Above all keep the bowels open. For the sediment in the urine it is

well to drink Vichy or Seltzer water freely during the day; or to take half a teaspoonful of bicarbonate of soda in a tumblerful of water in the course of the day.

2. The congestion of the head and the disturbances of vision are relieved by hot footbaths, with or without mustard, and of the cold water eye douche five minutes three times daily.

3. Lukewarm general bath taken three times a week will keep the skin in good condition, which is of value.

4. Those women who have a tendency to stoutness should adhere to a restricted diet, such as fish, meat, green vegetables, lettuce, salad and juicy fruits. Milk and beer are prohibited.

5. The few women who lose flesh must be well fed, and have chocolate and plenty of milk to drink, providing they can digest them.

6. A sudden suppression of the flow during this period is particularly dangerous, hence she should avoid getting the feet wet, wet skin, and should not take a cold bath nor wash the privates with cold water. All these refer to when the menses are present.

7. If hemorrhages occur employ the remedies advocated for the treatment of menorrhagia and metrorrhagia.

8. If the bleeding is quite profuse, pack clean pieces of linen tightly in the vagina, and allow them to remain until a physician is consulted, which should be immediately. This method of packing the vagina will control the bleeding until the physician arrives and institutes more radical measures. A good uterine tonic such as the pil uter ova often does much to relieve the nervous condition and allay pain and distress.

MISCARRIAGE OR ABORTION.

Meaning.—Abortion is the expulsion of the product of conception from the womb. It is also called miscarriage, by which name it is better known. Amongst the laity at large the term miscarriage is generally used when this accident happens without any violence on the part of the mother, whereas abortion is applied when attempts have been made to bring on this condition by the introduction into the womb of instruments.

Divisions.—Abortion has been divided into spontaneous or natural and accidental. A better division is spontaneous and artificial. The latter class is divided into therapeutic and criminal; therapeutic abortion is that in which it is done by the physician in the interest of the mother's life or health, while criminal abortion is without this or any other justification.

It is further divided into complete and incomplete; threatened and inevitable.

Complete Abortion.—By complete is meant that all the product of conception, fœtus and afterbirth, is expelled; incomplete, when only a part of it comes away, invariably the fœtus, the afterbirth or part of it remaining in the womb; when the symptoms of an abortion appear, and it can be checked, it is spoken of as a threatened abortion; whereas, if it is inevitable, when in spite of all that is done, miscarriage occurs.

Criminal Abortions.—The greater number of miscarriages occur in the first three months of pregnancy. It has been shown by statistics that criminal abortion is more frequent from the third to the sixth month than in the first two months. The explanation of this fact is due, that up to three months the woman hopes that there is simply a delay in the appearance of the flow, but when this hope fails she is ready to resort to any procedure to end a pregnancy which now becomes almost certain; on the other hand, when six months have elapsed the life of the child has become so manifest that she shrinks from its destruction. Movements of the fœtus in the womb make successful appeals to the mother's conscience, if not to her love also, for the salvation of the new life which dwells within her womb as its sanctuary.

Dangers of Abortion.—It is surprising the number of criminal abortions that occur yearly, and which fail to come to notice, unless the victim dies, when an exposé is made by the coroner. And even then many women die with the names of the abortionist and her seducer sealed upon her cold lips. Women do not for one instant think of the damage which is wrought to their generative organs, when they introduce some instrument or "what not" into the womb in order "to open it," so that a miscarriage will occur. Inflammations, displacements of the womb, and pelvic abscesses, and abscesses of the ovaries too frequently follow these foolhardy attempts. How many women have sacrificed their lives in this criminal and damnable manner?

Causes.—1. The causes of this unfortunate condition are numerous, they may be due to disease of the fœtus, placenta, womb or the mother. Then again the father may be at fault. For instance, men who are confirmed alcoholics, or suffering from consumption or syphilis will invariably have a serious effect on their offspring, in that if pregnancy should occur the fœtus dies within a month or so after conception. Abortion is of frequent occurrence in the wives of men who work in lead.

2. Violent exercise, as running, dancing, jumping, riding on a hard

trotting horse or over a rough road; lifting heavy weights, falls, blows, tight corsets, surgical operations, especially if on the organs of generation, are very prone to cause an abortion. Frequency of intercourse is not an unfrequent cause.

3. Among other causes which may be attributed to the mother, are infectious diseases, such as typhoid fever, during which she is very apt to abort; syphilis, this is one of the most frequent causes; backward displacement of the womb plays a very important part in this condition; a pregnant woman working in a tobacco factory is very liable to miscarry.

4. Again, violent sneezing or cough may be the cause. Tumors of the womb and malignant disease of this organ are also active factors; though as a rule a woman with cancer of the womb rarely becomes pregnant, the same applies to large fibrous tumors, and the smaller when located in the cavity of the womb. High altitudes will also produce an abortion, and it is asserted that in certain mountainous countries pregnant women descend to the valleys to escape the accident.

5. Medicines play an important rôle in the causation of this accident, such as active cathartics, laxatives and even emetics. The administration of quinine has been followed by miscarriage, although oftentimes it has been attributed to the disease and not to the medicine. But many of these drugs cannot be blamed for the accident, as there usually exists a tendency of some kind to a miscarriage.

6. The fœtus may be affected by the same diseases as the mother, which, if it should cause the death of the fœtus, will produce an abortion. Excessive distension of the womb due to plural pregnancy is apt to produce premature contractions of the womb, with a resulting miscarriage.

Symptoms.—1. There may be premonitory symptoms such as flushing of the face, alternate flushes, and of heat and chilliness, pain in the back, irritability of the bladder which may extend to the rectum.

The characteristic symptoms are hemorrhage and pains. These pains begin in the lower part of the abdomen and on both sides of the same, in the groin or just above it. As the condition progresses these pains extend to the back, and later on pass around to the front. The pains begin first, to be soon followed by a bloody discharge, or vice versa. Some cases have a gush of watery fluid early in the attack, which may be slightly discolored with blood; this discharge does not necessarily indicate rupture of the ovus and hence that miscarriage is inevitable, for it may occur from inflammatory diseases of the womb.

2. The flow of blood is very much greater than that which occurs

in menstruation; large clots are very apt to be passed, in which, if carefully sought for, the ovum may be found.

3. After seven or eight weeks of pregnancy the symptoms of abortion are quite plain. Prior to that time it may be mistaken for a case of painful menstruation.

4. If the pregnancy has advanced beyond three months the fœtus as a rule escapes first, soon to be followed by the afterbirth. If the afterbirth is not expelled the woman is liable to suffer from hemorrhages until it is removed. These hemorrhages may be so great as to cause a fatal result, providing the woman has not a physician in attendance.

Treatment.—1. If a woman is subject to repeated miscarriages she should exercise every care to place herself in the best surroundings during each pregnancy. At the regular time each monthly flow is expected she should remain in bed for a few days; this will give the body absolute rest and may tide her over to full time. If she has been in the habit of aborting at a special time, say the third or fourth month, when that period is reached she should go to bed several days before the time expected and remain there at least two weeks.

2. If the abortions are due to syphilis, a course of mercury and iodide of potash should be instituted. If due to a backward displacement of the womb, this should be corrected by placing the womb in its normal position and holding it there with a pessary, or by an operation if necessary. Sexual intercourse during pregnancy should be prohibited, as this is a very frequent cause of miscarriage.

3. When a pregnant woman feels pains in the lower part of the abdomen, soon followed by the discharge of blood, or sudden discharge of blood followed by pain, she has in all probability a threatened miscarriage. She should loosen all her clothing and lie down; her drinks should be cold; twenty drops of laudanum with half a teacupful of water should be injected into the rectum, or a half grain opium suppository may be inserted. If the symptoms are not abated in one hour the injection or suppository should be repeated, and again at the end of the second and third hours if needed. If the patient is very restless and nervous, twenty to thirty grains of chloral may be added to one of the opium injections; if such is done do not use warm water, but the yolk of an egg and some warm milk, in order to prevent the drug from irritating the bowel.

4. The opium may be continued from day to day as long as there is hope of arresting the abortion. Meantime once in two days the bowels should be opened by a warm water injection, or by a mild laxative.

Should the pain and hemorrhage cease it is better for the patient to remain in bed for three or four days after this cessation; when she gets up she should only gradually resume her usual habits of life, even then as an experiment, and be prepared to return to bed at the first recurrence of the former symptoms.

5. Unfortunately in the majority of cases the hemorrhages do not cease, or having stopped return, and the abortion is apparently inevitable, or the flow may be so great that it will be necessary to complete the abortion in order to save the life of the woman.

6. If the abortion is inevitable stop the bleeding and empty the womb. Hot water injections may be valuable to accomplish the former. If they do not suffice, then the vagina should be tightly packed with antiseptic gauze, antiseptic lamb's wool, or pieces of boiled linen or muslin. In order to hold the packing in place, a napkin should be tightly applied.

7. When an inevitable abortion is assured the physician may pack the vagina with tampons and allows them to remain for eighteen or twenty-four hours, and usually when removed the ovum (if it has not been previously expelled) and the afterbirth will be found forced out of the womb. If the afterbirth does not come away in twenty-four hours the woman should be placed under an anesthetic and the womb emptied of its contents. If not the discharge in a few days will have a very bad odor, and the patient develop blood poisoning.

Every woman who has a miscarriage should remain in bed at least ten days to two weeks after such an occurrence. The women who do not properly attend to this accident are the ones who later in after life pay the penalty, which either means chronic invalidism, or the removal of one or all of her pelvic organs, which may or may not result in death.

CONCEPTION.

Character.—A woman who has conceived is pregnant; pregnancy begins with conception and ends with labor, providing an abortion does not occur. It is normal when the uterine cavity contains the fecundated ovule or ovules; and abnormal, ectopic or extra-uterine, should it or they be outside of that cavity.

The Ovule or Egg.—Each month when menstruation occurs an egg or ovule, as it is called, escapes from the ovary. An ovule may come from the one ovary or from both, or two or more may come from the one,

and so forth. Leading from the ovary into the cavity of the womb is a tube called the oviduct. When the egg or ovule drops from the ovary, it falls into the end of this tube, which by a wave-like motion conveys it to the cavity of the womb, where it remains until the next menstrual period, when it is carried off with the flow. A new one is then deposited. It is estimated that women during their menstrual age pass many thousands of ovules.

Twins.—If one ovule passes down and the woman becomes pregnant that month the result will be one baby; if there are two ovules and impregnation occurs, the result will be twins, and so on.

Ectopic Pregnancy.—On account of disease, or from other causes, the progress of the ovule or egg may become obstructed, then the egg or eggs will become lodged in the tube. Should it or they become impregnated while lodged in the tube, the pregnancy will be an extra-uterine or ectopic pregnancy.

How Pregnancy Occurs.—How does impregnation occur? When the male has intercourse with the female the semen of the male is deposited in the vagina of the female in such a position as to "bathe" the neck of the womb. The heat of the parts causes this gelatinous seminal discharge to liquefy. The semen is merely a solution to convey the spermatozoids. The spermatozoid is composed of a head, of a tail and of an intermediate segment, sometimes called the body. The entire length of the human spermatozoid is not more than 1-500 to 1-325 of an inch. The spermatozoids have an eel-like motion, the tail being the motile power. The spermatozoids move along until one of them comes in contact with the ovule, the head then enters the latter, and the tail drops off. Conception then occurs. Although there are thousands of the spermatozoids in each seminal discharge, it only requires one to fecundate the ovule.

Movement of Spermatozoids.—Their rate of movement varies. It has been estimated about three inches in three hours. They have been found alive in men who have been executed seventy and even seventy-two hours after death. In the human female they were found endowed with active movements in the neck of the womb seven or eight days after coition. In temperate climates boys of twelve years may have discharges simulating the seminal fluid, but it is unusual for spermatozoids to be found in these discharges before they are fifteen or sixteen years old. One careful investigator claims that about one-half of men between sixty and eighty years of age are capable of fecundation.

STERILITY.

Causes.—1. When a woman is unable to become pregnant she is said to be sterile or barren. At least one marriage out of every eight is childless. It is commonly believed that the fault is always, or nearly always, to be found in the wife, but modern investigation has shown that the husband is at fault in about one case out of every six. When the male is at fault it may be due to impotence, which is an inability to perform the sexual act to aspermatism, although he may succeed in getting an erection he may be unable to have an ejaculation of semen; or to zoöspermia, the condition in which the ejaculated semen does not contain spermatozoids, and, therefore, has no fertilizing power. Or again the testicles may be improperly developed.

2. If the female is at fault it may be due to the absence of the ova. In chronic inflammatory diseases of the ovaries the ovule may disappear, or the end of the oviduct may become closed. If such be the case, the egg will drop into the general peritoneal cavity and be absorbed. Another cause is incapacity for sexual intercourse, such as absence of the female organs of intercourse, inflammatory diseases and tumors of the vulva and vagina. If the perineum is badly torn the seminal fluid will flow out, a cause of sterility.

3. A frequent cause is a very small opening in the neck of the womb, which is not sufficiently large to permit the spermatozoids to enter, and is termed stenosis. This should be dilated and is curable.

Treatment.—If due to inflammatory disease resort to the remedies described for the various inflammations of the generative organs.

If the end of the oviduct is occluded, and tumors are present, or should the perineum be badly torn, or a small opening in the neck of the womb be the cause, then an appropriate operation will be the only procedure which will tend toward future conception.

Lack of Orgasm.—A condition for which a physician is frequently consulted is lack of the normal feeling of the highest sexual excitement, called orgasm. With such the fault is probably due to some imperfection in the nervous system. The lack of orgasm may be found in otherwise healthy women, and not a barrier to conception.

In those who have never experienced the orgasm it is often incurable. With others the use of tonics, or pill neuro-tonal or comp. damiana will be found effective.

UTERINE PREGNANCY.

Nature's Most Wonderful Miracle.—It has been well said that every pregnant woman should be looked upon as a laboratory in which nature is performing that most wonderful of all her miracles, the fashioning of a new human being, and that nothing should be allowed in any way to disturb or derange this most important operation. Could such an idea be constantly kept in mind not only by mothers themselves, but by all those who surround or even momentarily approach the female who is performing the most sublime duty of her sex, that of continuing the race, and every effort made to aid her in accomplishing this great function in the most perfect manner possible, what vast improvements might be looked for, even in the next generation of mankind.

First Indication of Pregnancy.—The first indication of pregnancy is generally the stoppage of the monthly periods, and it is also one of the most reliable of the early indications. It should be remembered, however, that there is no certain sign of pregnancy, none which has not been found to fail, and lead into errors which were profoundly mortifying, if not worse, up to the time when the heart of the infant can be heard to beat through the walls of the mother's abdomen. This beat of the child's heart can seldom be positively identified before the fifth month, and often not until the sixth.

Failure of Signs.—In some instances pregnancy may occur and yet the monthly flow continue. This is quite common for one or two months, and less frequent for four or five. In fact, some mothers assert that the first intimation they had of being pregnant was quickening or feeling the motion of the child, which generally makes itself evident about four and a half months from the date of conception.

The Morning Sickness.—Morning sickness occurs with most females for the first few months of pregnancy, and some females when pregnant suffer intensely from it. It usually comes on whilst dressing, not being felt on first getting up, and when not very severe often passes off later in the day to recur, however, the next morning. It differs from other forms of sickness, such as those which are due to disease of the stomach itself, in that as soon as the vomiting is over the patient is often perfectly well again, and can take food immediately afterward. The sensitiveness of the stomach to odors and flavors, and the peculiar ease with which feelings of nausea are brought on by such impressions is a very significant

sign, and rarely fails, if supported by the other usual symptoms, to indicate pregnancy when it is well marked.

Changes in Mammary Gland.—Changes which occur in the mammary glands are valuable corroborative signs. They consist in the enlargement and puffiness of the nipple, the darkening and increase of size of the areola, and occasionally the secretion of milk. These indications show themselves during the second and third months.

Quickening Period.—Quickening is the feeling of the movements of the child, which is so constantly noticed by the mother about the end of four and a half months, or just half way through the pregnancy, that it often helps to fix the time of the approaching confinement. The first sensation is described as being like the fluttering of a bird, or the creeping of an insect, but after a few weeks it becomes progressively more decided, and more perceptibly like the struggles of an infant with human arms and legs. The popular idea that up to the time of quickening the child in the womb is not alive is, of course, totally erroneous, because if the infant was not living from the very day of conception it would not grow and develop. It is only felt primarily at this period because before the date of quickening its struggles have been too feeble and made too deeply in the cavity of the abdomen to be perceptible.

Changes in Abdomen.—In the early months of pregnancy the abdomen is often even flatter than in the unimpregnated female, but after the period of quickening enlargement occurs, and in the latter months becomes so great as to cause, in many instances, a good deal of distress by mere pressure, distension and weight. The stretching of the skin necessary to render it capable of covering the uterine tumor generally gives rise to numerous cracks in its surface, which remain as whitish scars through after life.

Changes in Disposition.—Changes in temper and disposition, longings for strange and unsuitable food, drowsiness, toothache, heartburn, palpitation of the heart, and so forth, are less constant and therefore less reliable symptoms of pregnancy, some of which, however, occur in a large proportion of the cases.

Duration of Pregnancy.—This average date is usually considered for the fruit of the womb two hundred and eighty days, or forty weeks, or a week over nine calendar months, from the day of the cessation of the menstrual discharge when last seen at the commencement of pregnancy. In order to be able to make this calculation accurately it is a good plan for every married woman to keep upon a calendar a regular account of the

OVARY AND MAMMARY GLAND

Figure No. 1.—The ovary, showing the vesicular bursted and the large grums which fills its cavity.

Figure No. 2.—Change in the breast from pregnancy.

A. Nipple.
B. Sebaceous tubercles.
C. Spots in the branded areola.
D. Marks due to the enlargement of the skin.

Figure No. 3.—Lobes of a mammary gland.

A. Acinos.
B. Canaliculi or small canals.
C. Conduit formed by several small canals.

Figure No. 4.—Mammary gland.

Figure No. 5.—Mammary gland in a woman.

a. Nipple.
b. Areola.
c, c, c, c, c. The gland lobes.
1. Breast or enlarged part of one of the conduits which carry milk.
2. Extremities of the conduits which carry milk.

Figure No. 1.

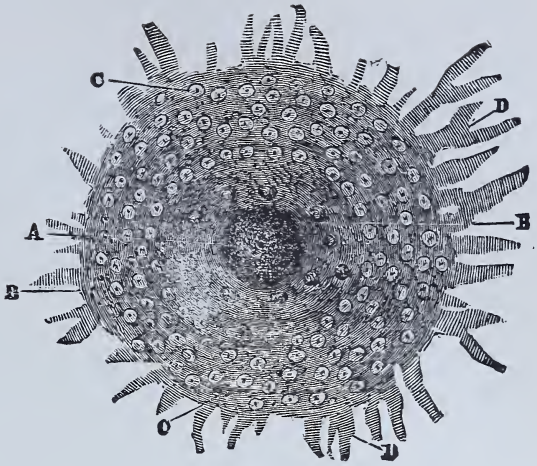
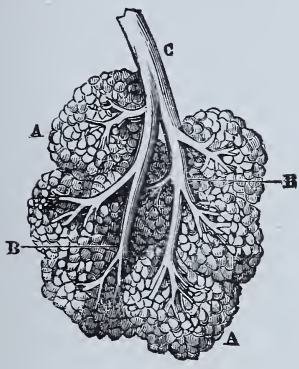


Figure No. 2.



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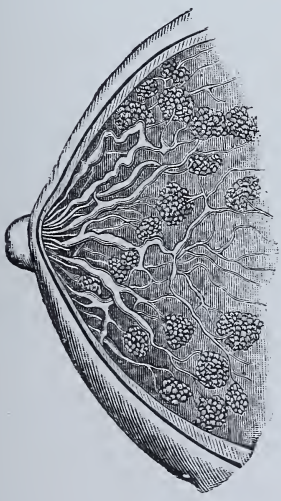

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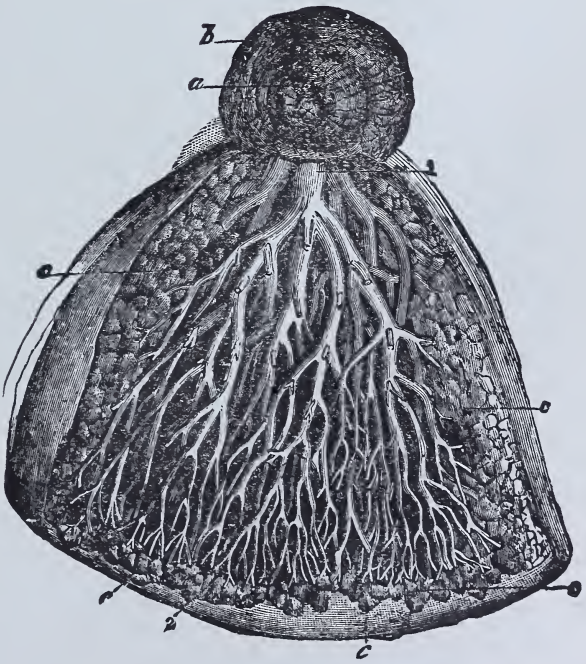

Figure No. 5.

OVARY AND MAMMARY GLAND

For an explanation of the illustrations see text on opposite page.

day in each month when she ceases to be unwell, so that if at any time before the next period impregnation should occur, she may have at hand the precise datum upon which to base her preparations. The date of quickening, when that is a prominent symptom, as is the case in most pregnancies, ought also to be carefully noted.

Pregnancy Table.—The table given below is one which will prove reasonably accurate:

Jan.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	
Oct.	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7	*Nov.*
Feb.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	
Nov.	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 2 3 4 5	*Dec.*
March	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	
Dec.	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5	*Jan.*
April	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	
Jan.	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4	*Feb.*
May	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	
Feb.	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 1 2 3 4 5 6 7	*March*
June	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	
March	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6	*April*
July	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	
April	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 2 3 4 5 6 7	*May*
Aug.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	
May	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7	*June*
Sept.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	
June	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 2 3 4 5 6 7	*July*
Oct.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	
July	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7	*Aug.*
Nov.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	
Aug.	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6	*Sept.*
Dec.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	
Sept.	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 2 3 4 5 6 7	*Oct.*

Explanation.—Find in the top line the date of the last menstruation the figure below will indicate the date when the confinement may be expected. If the date of menstruation is April 8, then the date of expected confinement will be January 13.

Care During Pregnancy.—The pregnant woman should ask herself, before making even a trivial variation from habits of life, which have been proved by experience conducive to her individual health, "can this change produce any injurious effect upon the future, mental or physical, of my darling baby?" and unless the answer is unequivocally in the negative, it is her duty to refrain from incurring unknown risks by alteration of diet, exercise, sleep, clothing, and so forth, which, previous experience has taught her, contribute most effectually to the preservation of her perfect sanitary condition.

Food During Pregnancy.—The amount of food taken into the system during the early period of pregnancy, as intimated by nature in the broad hint of morning sickness, should be rather less and of a more easily digested quality than at ordinary times. But in the latter months, when

the infant is rapidly developing and material must be supplied for muscles and bones in abundance, the quantity of aliment should be largely increased. It is better, however, to eat more frequently than to run any risk of over-loading the stomach at such time.

Exercise.—The amount of exercise should also be ample, since this is vitally important for the proper assimilation of food into the blood, whence it is transferred to the fœtus in the womb, and contributes, of course, every atom of the material composing the little body. Care must be taken, however, to avoid violent exercise of any kind for fear of bringing on abortion with all its dangers to the mother, and in the earlier months with certain destruction to the child.

Child Blemishes.—As regards the production of blemishes and deformities in the infant by mental impressions of the mother during pregnancy, there is a large amount of evidence that such an effect is produced, although many of the stories of such occurrences are grossly exaggerated or totally without foundation. At the same time a calm and equable frame of mind is greatly to be desired during the whole period, and anything which is likely to operate in the direction of causing mental shock, depression or excitement should be scrupulously avoided.

Vomiting.—1. Among the diseases of pregnancy are excessive vomiting, which may be treated with tablespoonful doses of lime-water, iced carbonic acid water, or iced champagne, ginger, bismuth, hydrocyanic acid, and two-grain doses of oxalate of cerium; heartburn, from which half a teaspoonful of bicarbonate of soda or ten drops of aromatic spirits of ammonia affords relief.

2. If the nausea is due to a prolapsed or backward displaced womb, the condition will be relieved by replacing the womb and inserting a lamb's wool tampon. A method which often suffices is to give the mother a cup of hot tea and a cracker about an hour before she arises.

The following prescriptions are advocated:

Tincture of nux vomica	2	drachms
Hydrochloric acid	½	ounce
Essence of pepsin	3	ounces

Teaspoonful after each meal and at bed-time.

Bismuth subnitrate	2	drachms
Tincture of nux vomica	10	drops

Make into ten powders. One powder every hour.

Carbolic acid or creosote	10	drops
Subnitrate of bismuth	2	drachms

Make into ten powders. One every two hours.

Excessive Vomiting, Treatment of.—The nausea and vomiting may be so pronounced as to be uncontrollable and is then called the hyperemesis of pregnancy. When this exists nothing will remain on the stomach, and the woman rapidly loses flesh and becomes very much exhausted. When blood appears in the vomited matter of these cases the termination, as a rule, is unfavorable.

The treatment consists of emptying the womb, in other words, producing an abortion, and is one of the exceedingly few reasons for which a physician is justified in producing an abortion.

Constipation, Treatment of the.—Constipation, which must be meddled with very cautiously by the aid of mild saline laxatives, such as a teaspoonful of rochelle salt, a dessertspoonful of castor oil, or injections of soap and water; and piles, the discomfort of which can be palliated only by the use of some such ointment as that already recommended, or daily doses of cascara.

Toothache, Treatment of the.—If toothache comes on care must be taken that sound teeth are not extracted in the vain hope of relieving it. When teeth decay rapidly in pregnancy it seems sometimes to be due to the removal of the bony materials for the purpose of building up the skeleton of the fœtus, and efforts should be made by supplying the lime salts as phosphates or hypophosphites mixed with the food to remedy the difficulty. Finely powdered bones have been shrewdly recommended.

Enlarged Veins, Treatment of the.—Enlargement of the veins of the legs should be treated by bandages or elastic stockings, and dropsy of the feet and ankles should lead to an immediate examination of the urine, lest some tendency to albuminuria may be threatening.

Bladder, Treatment of the.—Irritation about the bladder, perhaps with incontinence and retention, occasion much inconvenience, but can often be relieved by gentle laxatives and diuretics, such as the cream of tartar, or, if very troublesome, by a belladonna and opium suppository. The patient should, however, be guarded against the possibility of becoming fond of the action of anodynes, especially opium or chloral, at this trying time.

LABOR.

Definition.—Labor is the end of pregnancy, and may be defined as the process by which the fœtus and the afterbirth are separated from the mother. Nature's design being the continuance of the race, the fœtus must have reached such development before its expulsion that it is viable;

that is, capable of living external to the mother. If, therefore, the product of conception be expelled before such capability, the process is not called labor, but abortion or miscarriage.

Premature Labor.—Should labor occur in the seventh or eighth month it is called premature, because the fœtus has not attained its perfect development; if labor be delayed beyond nine months it is called postponed, if the fœtus be alive, but missed if it be dead.

Parturition.—Parturition is a term very often used instead of labor. When parturition occurs, with the efforts of the womb and the woman alone, it is called natural; but if it is necessary to render aid, usually by the application of forceps, it is called an artificial or instrumental labor. In order that a labor may be natural the fœtus must not exceed the normal size and the presentation must be normal, also the passageway and the muscular forces required to cause the expulsion of the passenger.

Duration of Labor.—This varies with race, place, climate, manner of living, hereditary, physical conformation, whether first or subsequent labor, and with the sex, presentation and position of the child. Labor is shorter in warm than in cold climates, in savage than in civilized races, in women in the country accustomed to plain food, outdoor exercises and regular habits, than in those leading opposite lives in the city. In the primipara (a woman who is having her first baby) it is longer than in the multipara (a woman who has had more than one child); it is also longer when the face or buttocks come first instead of the head, and with male than female children.

Labor with First Child.—As a rule the primipara is in labor fifteen to twenty hours; the multipara six to eight hours. If the primipara is thirty-five years old and more, labor may be prolonged for twenty-one to twenty-seven hours; above forty-one years labor is very apt to be thirty-three hours.

Duration of Second Stage.—The second stage of labor is generally one-third that of the first stage. The majority of labors begin between 9 and 12 P. M., and end between 9 P. M. and 9 A. M.

Birth Presentation.—The presentation of the child varies. By far the greater majority of the children are born head first. The child may present by the head, buttocks (when it is called a breech), face and either shoulder. The vertex or head may demand forceps application at times, especially if at the expiration of any hour during the second stage it fails to progress. Should the face present, the physician will endeavor to push it up and change it to a vertex, otherwise it will be necessary to apply

forceps. Such a child will have a blackened face, which discoloration at the end of a week or ten days will disappear.

Buttock Presentation.—If the buttocks present, more or less difficulty will occur, and it may be necessary to apply force to the after-coming head.

Shoulder Presentation.—A shoulder presentation will require an entire change of the position of the child, as this is an impossible labor. As a rule both feet are brought down first, the head being born last.

Preparations for Labor.—The lying-in chamber should be large enough for suitable ventilation, and yet not so large as to be with difficulty heated. Every precaution to secure for the invalid a full supply of unpolluted air should be instituted, and conveniences for affording hot water at short notice are of importance. The bed should be a hair or spring mattress, which ought to be covered with some waterproof material; over this a thick, old spread, newspapers or comfortable, to absorb the blood and other discharges, should be laid, and this again covered with a sheet. The remaining bed-covering must be arranged according to the season of the year. In this room should be collected all the clothing which will be needed for the comfort of the mother and expected infant, and besides the articles of every-day use there should be provided a strong sheet, which can be tied around the post at the foot of the bed, for the patient to pull upon during her pains, a firm cushion for her to press her feet against if she so desires, an abundant supply of towels, plenty of soap and warm water, a pound or so of lard free from salt, a few yards of flannel, a soft, warm shawl or small blanket to receive the baby in before it is washed, sharp-edged but blunt-pointed scissors to cut the cord or navel string, eight yards of coarse sewing cotton doubled eight times and knotted at the two ends for tying the cord, a binder of strong new muslin about a yard and a half in length and half a yard wide, or larger if needful, and a paper of large, strong safety pins for fastening the same around the invalid's abdomen after she is delivered.

The Mother's Dress.—The dress of the patient should be the usual chemise and night-dress rolled up around her waist, so as to keep them from being soiled, and a sheet folded in four and pinned around her limbs as a skirt, fastening it at the right side so that it can easily be unpinned and slipped down out of the way when the labor is completed.

Stages of Labor.—Labor, parturition or confinement, is divided into three stages. The first consists in the dilation of the mouth of the womb, sufficiently large to permit the fœtus to escape. The second constitutes

the birth of the child. The third is the expulsion of the placenta or after-birth.

First Stage of Labor.—During the first stage of labor the patient may walk around the room, sit up in a chair or lie upon a lounge, as is most agreeable to her, but when the mouth of the uterus is dilated to the size of a silver half-dollar she should take her position upon her left side, with her hips near the edge of the bed, and about a foot lower down than she is accustomed to lying. In this posture the medical attendant can best aid her in her trial until toward the end of the process, when some advantage is often gained by placing the patient upon her back.

Preparing the Nipples.—Preparation of the nipples should be made by washing them with strong green tea, or solution of a drachm of tannin in two ounces of cologne water, twice daily for three weeks before confinement, in order to harden the skin and render it less liable to crack and become sore whilst nursing.

Period of Actual Labor.—The period of actual labor is generally ushered in with slight griping pains in the abdomen, and more or less aching in the back, which come on at first, perhaps, at intervals of half an hour, lasting for a minute at a time; then at intervals of ten or fifteen minutes, and so on until they grow severe and the space of respite between them dwindles to five, four or even three minutes.

Pains and Length of First Stage.—In the first stage of labor the pains have a cutting or tearing character, and are commonly felt in the stomach, or lower part of the abdomen, and also in the back. They are accompanied by a frequent desire to pass water, produced by the pressure of the child's head upon the urinary bladder as it descends, and often by a disposition to evacuate the bowels, from a similar cause. Pressure of the head likewise frequently produces severe cramps in the legs, which may be partly relieved by friction, but often disappears as the labor progresses. The duration of this stage varies greatly, but in a labor of twelve hours' duration, the usual proportion would probably be ten hours in the first stage, an hour and three-quarters in the second stage, and fifteen minutes in the third.

Pains of Second Labor.—In the second stage of labor the character of the pains and the expulsive efforts which accompany them is changed. They now become what are commonly called bearing-down pains, in which the patient almost instinctively endeavors to aid the contractions of the uterus in its efforts to empty itself, by straining as if at stool; and, indeed, should she seem reluctant to yield to this disposition, she ought to be in-

structed to bear down exactly as if her bowels were being moved whilst constipated. The cries emitted are generally more like prolonged grunts, and can be readily recognized at a considerable distance by one who is familiar with their peculiarities. After a continuance of these pains for one, two or more hours the child's head, if that comes first, as happens in probably nineteen out of every twenty cases, begins to press upon the external parts or vulva, and finally, with an unusually forcible pain, often with a piercing cry from the mother, her baby's head emerges into the world. As a rule, the next pain expels the shoulders and hips, the rest of the body offering little resistance to the expulsive efforts of the womb after the head is born.

Third Stage of Labor.—The third stage, consisting in the delivery of the placenta, is usually attended with one or two slight pains, by which the afterbirth is forced out of the womb into the vagina, whence it must usually be removed by the medical attendant.

Although in the majority of cases any intelligent person could successfully manage a case of labor, there are numerous accidents, malpositions and complications, which may occur without any warning in any particular case, so that if skilled medical assistance can possibly be procured it should by all means be sent for. The man or woman who neglects this runs a terrible risk of being the murderer of the mother or of the child, perhaps of both.

Duty of Midwife.—But if no qualified physician is procurable, the acting midwife should from time to time, say every ten minutes during the second stage of labor, anoint the vulva or external parts of generation of the patient freely with lard, at the same time examining very gently, with the finger, what progress is being made in the descent of the head, supposing, as is usually the case, that forms the presenting part, as this too frequently causes puerperal sepsis, which see.

The Delivery.—The moment the head is born the finger should be repassed in around the infant's neck, so as to find out whether the navel-string is wound around it, as not unfrequently happens. If such is the case, the cord should be pulled down a little, and the mother urged to bear down for the child's sake, as rapidly as possible, and complete the birth; when the cord must be immediately loosened and slipped over the baby's head to save it from strangulation. At the same moment the head of the child comes into the world the midwife's other hand should be placed upon the lower portion of the mother's abdomen, and the uterus pressed upon gently.

Treating the Womb.—As the body of the child is born the uterus should contract to the size of a ball, apparently about five inches in diameter, and if this does not take place, the womb should be firmly grasped through the walls of the abdomen, in the hand, and so stimulated to due contraction. This is very important, because, if it does not occur promptly the patient may bleed to death in a very few minutes.

Attending the Child.—As soon as the womb is found to be properly contracted into this hard ball, attention should be turned to the child. If it cries at once, the cord may be immediately tied an inch and a half from its attachment to the infant, with the sewing-cotton already provided, and then cut half an inch above this again, that is, half an inch further away from the child, squarely off. The baby is then to be lifted up, with both hands clasped around its body, for it is very slippery, and received by an attendant in the flannel or old blanket, which has also been prepared. The attendant ought either to hold it until the labor is completed, or to place it on its left side, in some safe situation, preferably in its cradle or crib, not in an armchair, where it may be crushed to death by being sat upon.

Expelling the Afterbirth.—During this time the midwife should keep her hand upon the patient's abdomen, gently pressing and kneading the womb occasionally, in order to promote the recurrence of a contraction, strong enough to expel the placenta. As long as the afterbirth remains the woman is not safe from dangerous or fatal flooding; but whilst the uterus continues firmly contracted, and feels like a hard ball under the fingers of the midwife, there is but little danger. After five or ten minutes, if slight pains come on, the mother should bear down a little, and the cord be gently pulled upon, when, in many instances, the placenta comes away. As it reaches the vulva, the patient should be told to cease her efforts, and the midwife should twist the afterbirth round and round on itself, eighteen or twenty times, gradually withdrawing it at the same moment. This is to wind the membranes, or bag which held the water into a string, if possible, inside the vagina, and perhaps the uterus, so that they may all come away with the placenta in safety. The mass, when removed, should be laid away for subsequent careful examination, in order to determine whether any part has been left in the mother, as the effects of such an accident are much to be dreaded.

Contracting the Womb.—The attention of the midwife should, however, immediately return to the mother, and her hand at once applied again over the abdomen, when the womb ought to be felt as a ball of some

three and a half inches in diameter, or about the size of the new-born baby's head, and even harder than before. If not so felt, firm pressure and friction over the abdomen must be made to induce it to contract. Should it not do so within a minute or two the midwife must introduce her hand up the vagina into the cavity of the womb, under strictly antiseptic precautions, and pulling out the clots of blood she will probably find there, strive again to excite the womb to its proper contraction.

To Prevent Flooding.—Should these efforts prove unavailing, not a moment is to be lost, for the next five minutes will perhaps cost the patient her life by flooding. Let, therefore, a piece of ice, a sponge dipped in vinegar, or a peeled and gashed lemon, be carried up with one hand and rubbed around inside of the womb, whilst the other hand of the midwife, by firm pressure and friction over the patient's abdomen, contributes to stimulate that uterine contraction in which lies the mother's only safety. Or a teaspoonful of ergot, repeated in fifteen to twenty minutes. As soon as this is accomplished, as it probably will be by these remedies, a tight bandage should be pinned around the patient's body, with two or three folded napkins beneath it, pressing upon the part of the abdomen over the womb, to prevent relaxation, which happily seldom occurs when thus treated.

Making the Mother Comfortable.—After being securely bandaged, the patient may be lifted up a little, out of the wettest part of the bed, if it can be done without any effort on her part; but for fear of flooding, the more quiet the parturient is kept for the first two hours after labor, or until the blood has had time to clot firmly in the large, open-mouthed veins of the uterine cavity, the less is her danger. When the patient is made as comfortable as possible, a clean napkin, loosely folded, is to be placed between the thighs, but not pressed up tightly against the vulva, lest it act as a plug and prevent the detection of flooding, should that come on.

Should the Child Not Cry.—In case the child does not cry when first born, its mouth should be carefully cleared of mucus and other obstruction, and a little cold water sprinkled upon its breast. Should this fail in rousing a gasping effort at breathing, the baby, still attached to the cord, if that is pulsating, should be put into a basin of very warm water, and after a minute or two, when the surface of its body is well heated, the dash of cold water over its face and breast again tried. If still unsuccessful, the baby should be wrapped up in hot flannels, and artificial respiration, by blowing into the mouth whilst the nostrils are held, and then forcing the air out by compressing the chest, attempted as a forlorn hope.

The writer has found the results of dry heat, applied by cautious roasting before a fire, promising enough to warrant further employment in otherwise hopeless cases.

Baby's First Bath.—If, on the contrary, the child cries lustily, and the mother is doing as well as can be expected, the cord should be again examined to verify the fact of its being securely ligated, and the baby given its first bath. The infant should be rubbed all over with lard, to soften the *vernix caseosa* or cheesy matter with which it is more or less covered, then well washed with white castile soap and milk-warm water and thoroughly dried.

Dressing the Navel.—The cord is dressed by being drawn through a hole cut in the middle of a piece of soft old linen, folded once, and trimmed to four inches square, and after being wrapped in this is laid upward on the baby's stomach, and bound in place by a belly-band of silver flannel, fitted snugly but not too tight, and secured by safety pins or a few stitches, or the cord can be dressed in absorbent cotton and freely covered with boric acid.

Of the Wrong Presentations.—The management of labor when the back of the head does not come down first, and especially when the buttocks, feet, or arms present, is so apt to be difficult and dangerous that a physician ought always to be summoned, even from a great distance and at the utmost inconvenience, should any signs of a "cross-birth," as it is popularly called, be detected, or should unusual delay in delivery render obstruction probable. It will sometimes be a comfort to a woman in labor who is anxiously awaiting the physician's arrival to be reminded that if the birth comes before the doctor it will be because everything is all right, whilst, on the contrary, if there be anything wrong, the physician will usually have ample time to reach her before his services are actually needed.

After-Management of Labor.—The management after labor should be such as will best avoid any excitement, either mental or physical, liable to light up inflammatory action in the womb, which has just been the subject to such momentous change. The patient, in ordinary cases, ought to remain in bed until the twelfth or the fourteenth day, partaking of semi-solid food until the third day, when the bowels should be moved. For this purpose she may be given a bottle of the citrate of magnesia in two doses, one-half hour apart, salts or an enema. After the bowels have been thoroughly moved, solid food should be given. She should not receive company for at least three days, but devote all her energies to the task

of recovering as speedily as possible, both on her own account and for the sake of the frail, new life so utterly dependent upon her care.

PUERPERAL CONDITIONS.

Character.—The puerperium, or the puerperal stage, is the two weeks following the birth of the child. It begins immediately upon the expulsion of the placenta.

Among the conditions of the puerperal state may be mentioned after-pains, which, though seldom troublesome subsequent to first deliveries, may in others cause more suffering than the labor itself.

After-Pains.—They can, however, be greatly relieved by the use of ergot just as delivery is accomplished, and of one-half grain opium suppositories, or forty-drop laudanum injections, or a Dover's powder, in two or three hours if they persist.

Sore Nipples.—Soreness of the nipples and cracked nipples are very apt to come on in patients with tender skins from the constant irritation of the baby's gums in nursing, and are unfortunately very difficult to heal, because the same irritation which originated the trouble in the first place is continually kept up.

Treatment of Nipples.—Vaseline, zinc ointment, laudanum and nitrate of silver sometimes succeed in curing the sore, but the most successful plan is to use a wooden shield with a rubber nipple if the baby can be persuaded to consent to the innovation. Women who suffer in succeeding pregnancies from this condition may do much to prevent its recurrence. About three months prior to the expected date of confinement, rub the nipples night and morning with cocoa butter and expose them several hours daily in the sunlight. Before and after nursing the nipples of the mother and the mouth of the baby should be washed with a solution of a teaspoonful of boric or boracic acid in a tumblerful of water. The nipples should be thoroughly dried.

Danger of Cracked Nipples.—The great danger of cracked nipples is that it may lead to abscess of the mammary glands (the so-called gathered breasts).

CHILD-BED FEVER OR PUERPERAL FEVER.

Character.—Puerperal fever is a very dangerous disease, which is invariably due to a lack of antiseptics. All cloth or napkins that come in contact with the vulva of the woman which have not been boiled, the

hands of those attending to her unless thoroughly washed, all instruments used unless rendered aseptic will carry dirt of some kind, giving rise to this condition, which, practically speaking, is blood poisoning.

It generally comes on or about the third to the fourth day after delivery with a violent chill, great thirst and extreme prostration.

Symptoms.—The uterine discharge, or lochia, which should persist for ten days to two weeks, becomes very foul, the odor of which is nauseating, or it quickly dries up.

The fever may run very high, and diarrhœa with obstinate vomiting may set in. The mind soon grows clouded, if the attack be a severe one, muttering delirium makes its appearance, and the patient often dies on the third to the seventh day of the attack in a condition similar to that observed in typhus fever.

Treatment.—A large majority of the cases prove fatal, but full doses of twenty to thirty grains of quinine, with one-thirtieth grain of strychnine sulphate every two to three hours, succeeds in saving a small proportion of the cases. If an abscess forms, be it in the pelvis or elsewhere, it should be incised and drained. Cold sponge baths every two or three hours will reduce the fever, and an ice bag to the head will oftentimes prevent brain complications. Injections of bichloride of mercury should be used once or twice a day.

Puerperal Mania.—This is a form of insanity liable to come on a week or ten days after confinement, in which there is frequently a singular aversion to the child, and perhaps to the husband also. A tendency to suicide is also prominent, and patients thus affected should be watched with the most unremitting care. Under perfect rest, nourishing diet, moderate stimulation and sedatives persons generally recover.

Puerperal Convulsions.—These may come on before or during labor, as well as in the month following delivery. They are generally due to accumulation of urea in the blood, the consequence of temporary Bright's disease, resulting probably from the pressure of the uterus containing the fœtus upon the kidneys. The treatment has already been pointed out under the head of uremia.

Milk-Leg.—This is an inflammation of the lymphatics of the limb, coming on especially toward the end of the second week after labor and deriving its name from the milk-white appearance usually presented by the skin of the affected part. As the febrile state of the system is apt to cause drying up of the milk, it was formerly supposed that in some mysterious way the lacteal fluid was transferred to the leg. At first it

may be quite painful, but after the integument becomes accustomed to distension, the sensations are rather those of weight and discomfort than of positive suffering. The treatment is by laudanum or turpentine fomentation at first, and later with stimulating and anodyne liniments, which hasten a little the naturally tardy convalescence. The ordinary duration of the affection is from a month to six weeks.

MANAGEMENT OF THE INFANT.

Suckling the Baby.—After a baby has received its first bath, and been for the first time introduced to the mysteries and miseries of clothes, it should be put to the breast for the purpose of extracting whatever nourishment nature has there provided for it, and also as the commencement of its education in the art of nursing, a business upon which its life for some months will depend. Curiously enough whilst some children take hold of the breast as if by instinct, others must be taught to nurse, and show for this vital operation all the perverse unwillingness of Shakespeare's schoolboy, notwithstanding it is the one thing in the world they have to do.

Mother's Milk the Best.—Every mother ought, if possible, to suckle her own infant, not only for her own sake but for that of the child. Statistics show that babies nursed by their mothers, amid the unfavorable surroundings of prison life, thrive better than those who are brought up by hand in healthy country districts outside, and no woman in good health, who can furnish the nourishment, should be spared the reproach of risking the life and health of her offspring if she refuses to perform her maternal duties in this regard. A mother undertaking the suckling of her infant should, moreover, do so with a mind fully alive to its importance, and with a firm determination that no pleasures of society or of fashion shall interfere with its conscientious performance, or else she had better not attempt it at all.

Amount of Breast Milk.—The amount of milk contained in the breast, especially with the first child, is very small for two or three days, but in some forty-eight hours the rush of milk, as it is called by nurses, commences, and is often attended with some fever, and marked pain and soreness in the breasts. The remedy for this disturbance in the mother's system is, however, very simple and conveniently at hand, and as the child, which, if healthy and vigorous, generally has a good appetite, draws out the milk which nature has provided for its special benefit, all these

uneasy sensations soon subside. If the coming in of the milk is unusually delayed, it may be necessary to give the baby a little cow's milk, well diluted and sweetened with sugar of milk; but this is seldom required.

Mothers to Avoid Excitement.—During the time a mother is nursing her infant every care should be used to avoid any violent mental excitement or shock, which is exceedingly apt to influence the secretion of the mammary glands to a certain extent, just as it does that of the lachrymal gland, and render the lacteal fluid temporarily unwholesome or poisonous to the infant; or it may completely suppress the secretion of milk, with very serious consequences to both the parent and her offspring.

The Wet Nurse.—If, for any reason, the mother is unwilling or unable to suckle her infant, the next best chance for the baby's life is to procure a good wet nurse. When such an alternative is adopted, great care should be exercised in selecting the foster-mother, and the physician's advice ought always to be obtained upon this important subject.

Bringing Up by Hand.—Should the mother fail to nurse her child, and no good wet nurse is procurable, the child must be brought up by hand, a species of manipulation which contributes, it is probable, more than anything else to swell the lists of infant mortality in most large cities, as well as to some extent in country districts. Although goat's milk is used occasionally in this country as an infant's food, practically the choice is narrowed down in most cases to cow's milk, and the great object should be to secure this from healthy animals, pure and free from all admixture, as pointed out in an earlier chapter upon milk as an article of diet, and in a perfectly fresh condition.

Testing the Milk.—All milk used for the feeding of young infants, especially in the summer, should be carefully tested, and particularly in regard to its acidity, with litmus paper. If found to be acid it ought to be at once rejected, and a sample of pure, sweet milk obtained.

Putting Baby to the Breast.—A new-born infant is not hungry, consequently it need not be put to the breast for three or four hours or more. This will also give the mother a chance to obtain a little needed rest. For the first twenty-four to thirty-six hours the baby should be put to the breast every four to six hours. The subsequent twenty-four hours about every three to four hours. About the third day or so, when the milk is well established, the baby should be nursed every two to three hours.

Time for Nursing.—Under no consideration nurse the baby between 11 P. M. and 5 to 6 A. M. If mothers would only institute this from

the time of birth, both she and the baby will obtain a good night's sleep. Should the baby awaken, change its position, and give it a little water to drink, and invariably it will go off to sleep. Another bad practice is to give the baby the breast every time it cries, in order to quiet it. It should be conquered from the beginning, so do so.

Weaning the Child.—The time for weaning, generally about the age of nine months, should be determined partly by the growth of the teeth, presuming, of course, that the mother's health is not suffering in the meanwhile. When the first lower middle incisor teeth appear, which usually happens about the sixth or seventh month, the mother may begin to diminish the number of times for suckling more rapidly, at the same time replacing the breast milk, of which the infant is deprived, by cow's milk thickened with oatmeal, barley or wheet flour, and so forth. After the child has four teeth it should be weaned, although if the infant is feeble or the season unfavorable, the period of nursing may be extended a few months longer.

Dilution of Milk.—If the new-born baby is not nursed and fresh cow's milk is employed, it should at first be diluted with half its bulk of pure, tepid water, sweetened with a teaspoonful of sugar of milk to one-quarter of a pint of milk, and a few grains of salt. Condensed milk will not require sweetening, but should be freely diluted so as to resemble human milk in color. For the first month of a child's life it may be mixed in the proportion of one part of the condensed milk to ten or twelve of warm water.

Cleanliness of Nursing Bottle.—The most rigorous cleanliness of the nursing bottle and nipples must be insisted on, and under no consideration should the long rubber flexible tube apparatus be employed. It is an exceedingly dirty arrangement, as it cannot be properly cleaned. Simply use a very plain bottle, keeping the nipples in a soda solution.

Foods Other than Milk.—When a child does not seem to thrive well upon pure or diluted cow's milk, it has often been advised to resort speedily to mixtures of milk with meat broths, raw eggs, and so forth. Bretonneau reported, as early as 1818, that when children under his care who were suffering with tabes mesenterica, were fed with milk and meat broth, they rapidly improved, and other authorities recommend this mixture as the next best thing to woman's milk, or the malted milk can be tried.

EXTRA UTERINE PREGNANCY.

This constitutes a pregnancy occurring in the oviduct and not in the cavity of the womb.

Symptoms.—1. The woman will have all the symptoms of pregnancy. A pregnancy of this kind invariably follows a long period of sterility. The woman who has previously menstruated regularly will miss a period and consult a physician. If he examines her to ascertain the cause of the stoppage of the flow, and this variety of pregnancy is present, he will find the uterus very slightly enlarged and a mass to one side of it.

2. About four to eight weeks, as the fœtus continues to grow, the distended tube may rupture, or the contents may be expelled through the end of the tube (tubal abortion).

3. If the tubal abortion or rupture occurs, the woman will first notice a sudden, sharp, severe pain in the abdomen. This will be followed by fainting spells which may or may not end in death, due to the loss of blood.

Treatment.—If the condition is recognized prior to rupture, the woman should submit to an operation at once, before rupture takes place, which accident invariably terminates in death.

If the woman is not seen by a physician until rupture does occur she should be operated on at once, in order that the bleeding vessels may be tied. In a few rare cases nature checks the bleeding, which will be followed by a second rupture, usually with fatal results.

PART XI OF BOOK IV

Treats of the diseases of the skin, hair and nails.

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CURATIVE MEDICINE

PART XI.

SKIN DISEASES

This class of affections embraces diseases of the skin, hair and nails, and therefore includes maladies which occasion much distress and deformity, but are seldom dangerous to life.

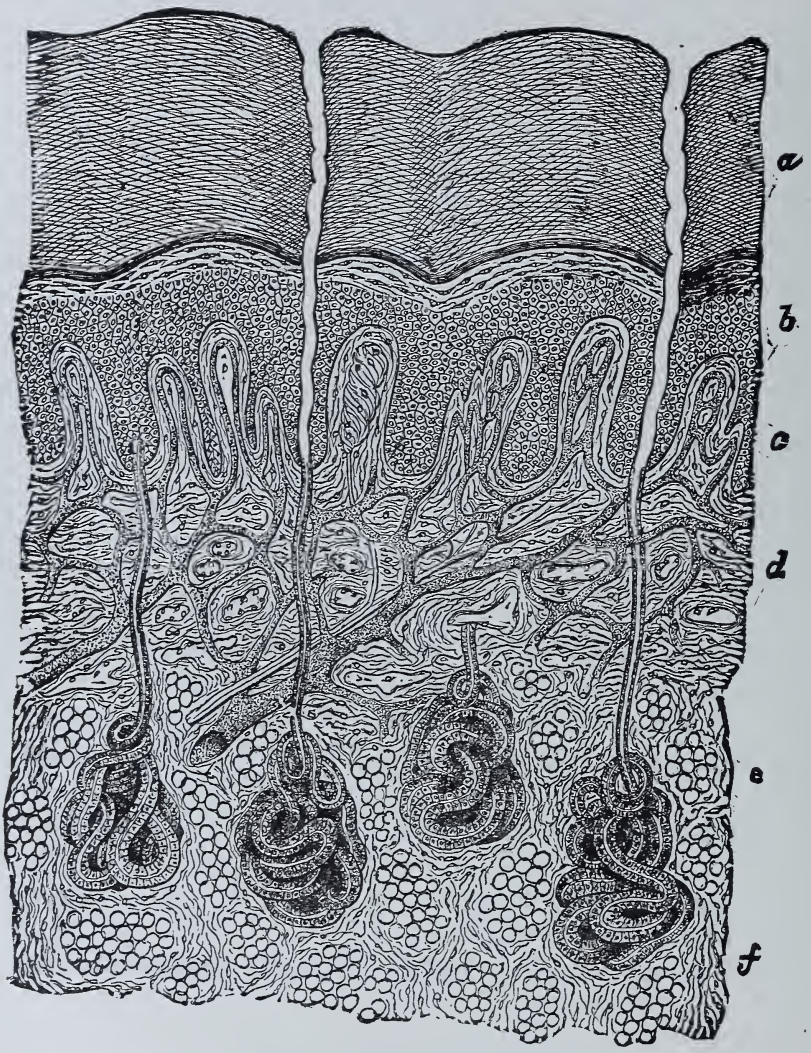
Classes of Skin Diseases.—Skin diseases are easily recognized, but there is sometimes difficulty in distinguishing between the different forms. They divide themselves thus:

1. Those of an eruptive (erythematous) character.
2. The catarrhal, in which the conditions resemble those belonging to inflammation of the mucous membrane.
3. The vesicular, which is composed of small blisters.
4. The pustular, made up of pustules or small boils, containing pus or matter.
5. The papular, in which pimples appear, containing neither water nor pus.
6. The scaly eruptions in which the affected parts are covered with dry, whitish layers of epithelial cells.
7. Skin diseases caused by animal or vegetable parasites, of which the itch is a remarkable illustration.

SKIN REDNESS (Erythema).

Symptoms.—Erythema is the name applied to the redness due to a superficial inflammation of the skin. It is the mildest form of skin disease, and is apt to affect fat people in hot weather. Infants are liable to be affected with it behind the joints.

Treatment.—See Nettle Rash.



THE SKIN

a. Epidermis or cuticle.
b. Dermis or true skin.
c. Nerve prolongations.
d. Blood-vessels.
e. Oil cells.
f. Glands.

NETTLE RASH (Urticaria).

Symptoms.—This is an eruptive affection which sometimes comes out quite suddenly, and is attended with a most troublesome itching. It is characterized by the formation of "wheals" or rounded patched of elevated skin, whiter than the surrounding parts, which are slightly reddened at the margins.

Causes.—It may arise from the bites or stings of insects; from the eating of certain fish, especially shellfish; or from reflex irritation, and other causes.

Treatment.—It is greatly aggravated by scratching, and, like simple erythema, is relieved by dusting with finely-powdered oxide of zinc and starch, with lycopodium, or even with rye flour. Lotions of lead water, benzoic acid and borax are also sometimes useful. Locally carbolic acid, two drachms; glycerine, two drachms; water, one pint. Small doses of calomel, followed by a saline.

MOIST TETTER OR ECZEMA.

Symptoms.—Eczema, sometimes called moist tetter, is a catarrhal inflammation of the skin usually attended with a breach of surface. It presents at first irritable, raw, red patches, with occasional little blisters which soon break and a fluid is discharged, which in drying forms crusts or scabs. Later on the patches become dry, scaly, and often cracked. This is a form of skin disease which is often seen in young infants, in whom it sometimes receives the name of milk-crust. The pain, burning and itching of eczema are intense, and yet it is only aggravated by scratching. It is especially apt to appear about the flexures of the joints, as, for example, in the hollows of the elbows and knees.

Treatment.—Many formulas have been recommended and used for this prevalent condition. Stimulation of the skin is of great importance, and various drugs have been used for that purpose, such as resorcin, tar, camphor, etc. The following have been recommended by various specialists on the disease:

R.—Camphor ..... 1 drachm
Oleate zinc ..... 2 drachms
Powd. starch ..... 1 ounce
Use freely as a dusting powder.

R.—Acid boric ..... 2 drachms
Acid carbolic ..... ½ drachm
Glycerine ..... ½ drachm
Water ..... 1 pint
Apply twice a day.

Resorcin ..... ½ drachm
Bismuth subnitrate ..... 2 drachms
Glycerine ..... 2 drachms
Lime water ..... 4 ounces
Apply two or three times daily.

Some cases do better with an ointment, when the following may be applied:

R.—Ichthyol ..... 1 drachm
Pulv. Camphor ..... ½ drachm
Zinc ointment ..... 1 ounce

SHINGLES OR HERPES.

Symptoms.—Herpes, which is a good type of the vesicular affection of the skin, is characterized by little blisters which come out in small groups, and when appearing about the mouth and nose constitute the cold-sores with which almost everyone is familiar.

Shingles Proper.—A severe form called herpes zoster, or the "shingles," comes on with smarting and burning pain in a belt half way around the body of large patches of the eruption. It is distressing and tedious, often lasting a month or six weeks, but rarely dangerous. The popular idea that it will prove fatal if it goes all around the body is without foundation.

Treatment.—The only treatment is to apply anodynes and soothing lotions, such as the morphia and lead water recommended in erysipelas, and administer opiates to relieve the pain, or pil acetanilide comp.

PEMPHIGUS.

Character.—Pemphigus is another vesicular eruption, characterized by the formation of large blisters, from half an inch to two inches in diameter, resting on slightly reddened surfaces, and mostly attended with severe itching. These blisters sometimes appear on the fingers, but commonly attack the lower limbs. They should be punctured at once and boric acid applied. They generally indicate a more or less impoverished state of the system, in which iron, quinine, strychnine and good nutritious food are called for.

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ECZEMA.
Scaly Form.

ECZEMA.
First Stage of Simple Eruption.

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SCALD HEAD (Favus).

Remedy.—Arsenic is also very useful, and locally soothing ointments or absorbent powders may be employed.

IMPETIGO (Pustular Eruption).

Character.—Impetigo is the most common of the pustular eruptions, and is characterized by the formation of separate pustules, somewhat like those of small-pox. They may attack any part of the body, but are most apt to appear upon the face and limbs. This disease, like eczema, which in many respects it resembles, seems as if it were an aggravated form of impetigo, and is especially frequent among children, although adults are not exempt. Impetigo is always associated with general debility, defective nutrition, or hygienic neglect.

Remedies.—The treatment is by good food, tonics, with cod-liver oil, and strict attention to cleanliness. Soothing applications, such as Goulard's cerate, should be made first to the pustules, but later on a very mild mercurial ointment is more effectual. Mild antiseptics or boric acid can also be used.

BOILS.

Causes.—Boils, those common and exceedingly troublesome inflictions upon mankind, are classed under the head of pustules. With all the advances we have made in late years in pathology, the cause of boils still remains undiscovered. Sometimes they seem to be due to high living, and in other cases poor diet appears to determine the advent of a troublesome series of these parts. One boil is very apt to precede a crop of fifteen or twenty, although there is no certainty that this will be the result.

Treatment.—1. The best way of managing a boil is to poultice it with flaxseed or bread and milk, containing laudanum to ease the pain. If the boil is small, the poultice may be spread upon a piece of oiled silk, which prevents it from becoming dry, and held in place by a bandage, or by a square piece of linen upon each corner of which has been daubed a little spot of adhesive plaster, the stick of plaster being melted in the flame of a candle for the purpose. This holds a dressing of any kind on a broad, flat surface of the body, as, for instance, the skin of the back, very satisfactorily.

2. When the boil softens in the centre, and the fluctuation of matter can be detected, or its yellowish color can be seen under the skin, some twenty-four hours of suffering may be saved by having it lanced, and the pain of the cut may be abolished by freezing the surface with ether spray,

or by stroking it with a little bag containing a mixture of ice and salt. In certain cases it is important to lance a boil early, so as to prevent the burrowing of the pus toward some important structure; but ordinarily, if the sufferer dreads the knife, there is no actual necessity for using it, and the boil may safely be left to break of its own accord, under the poultice, one, two or three days later than the time when it is ripe for lancing.

3. Lancing the little pimple, with which a boil first commences, exactly through the middle, which can be done almost painlessly under the ether spray, will nearly always cut short this troublesome affection. Ten or twelve grains of quinine daily, so as to produce slight cinchonism for a week, occasionally breaks up a course of boils, but is by no means an infallible remedy.

CARBUNCLES.

Character.—Carbuncles chiefly differ from boils in the larger area involved in the inflammation, from which a core of dead connective tissue, called a "slough," several inches in diameter, may come away. Carbuncles are apt to come on the nape of the neck, and on the back, but may appear on any part of the body. A large carbuncle will sometimes keep a patient in bed for a month or six weeks, and the pain and exhausting discharge wears out the strength so much that it may cause death; if a second of large size appears, after the first begins to heal, as it is not very unusual, it quite frequently proves fatal.

Treatment.—Poultices of flaxseed meal, bread and milk, powdered slippery elm bark, or of yeast; anodynes to relieve pain; and twelve grains of quinine daily, with tincture of iron to support the strength, constitute the appropriate treatment. Early and free incisions into the inflamed tissue, made after freezing the part, are of great service. After opening apply equal parts of carbolic acid and glycerine.

PIMPLES.

The papules or pimples are solid elevations of the skin, containing neither water like the vesicles, nor pus like the pustules. They are three in number, including strophulus, the red gum or tooth-rash peculiar to infants, lichen or prickly heat and prurigo.

Strophulus.—This consists of an eruption of innumerable small, reddish pimples, which occur for the most part on the face, neck and arms of young children. The irritation and general disturbance is slight. The eruption is usually caused by digestive derangement of some kind, as, for

instance, that of cutting a tooth, and passes away with the cessation of its cause.

Treatment.—The only treatment necessary is some mild, saline laxative, and a lotion of very weak solution of carbonate of soda, five or ten grains to the ounce, with a teaspoonful of glycerine, to allay the itching if that appears to be very troublesome.

Prickly Heat or Lichen.—This is very common in hot weather, in the simple form of reddish pimples, which itch a great deal but usually subside on the approach of the cooler season. It sometimes takes on a severe form, and may even become chronic.

Treatment.—In mild cases tepid baths, plain and easily digested food, an occasional saline laxative, with a tablespoonful of infusion of gentian, and five grains of bicarbonate of potash or soda internally, three times daily, will effect a cure. To relieve the itching, solutions of borax, vinegar or carbolic acid may be used with advantage. In aggravated cases the more powerful tonics, with tablespoonful doses of cod-liver oil and one-sixteenth of a grain of arsenic three times a day must be resorted to.

Prurigo Symptoms.—This is characterized by an eruption of pale, slightly elevated pimples, most situated on the trunk of the body, and attended with very intense irritation, especially at night, so that the marks made by the patient's nails in scratching can almost always be seen, and aid in recognizing the malady. It is frequently the result of the presence of the vermin with which so many dirty people are infested.

Remedies.—Cleanliness, by the aid of strong alkaline baths, and the use of an ointment of carbolic acid, or if white precipitate, with the administration of tonics and good food will generally effect a cure. Sometimes, however, the disease, unless it is carefully treated early, proves very obstinate, being kept up in great measure by the constant scratching, which it is very difficult for the patient to abstain from.

PSORIASIS (Tetter).

Character.—Psoriasis is the most important scaly eruption; in certain of its varieties it probably constituted one form of the leprosy of the Bible. It is characterized by the appearance, at first, of oval or rounded patches of slight irritation, then upon these an eruption of scales, which grow dense and white toward the centre. Afterward the spot expands from its outer edge, where the skin is often reddened and slightly raised above the level of the surrounding surface. This is the skin disease to

which the name of "dry tetter" is commonly applied. In the worst or inveterate form, the whole body may be covered with these white scales, except the face, the palms of the hands and the soles of the feet. Even these do not always escape. The incrustation of scales in this variety of psoriasis is thick and dense. When it has lasted for some time, the skin chaps and breaks, after which there is severe soreness with exudation of fluid from the broken surface, intense irritation and itching, with great general and physical exhaustion, lasting for many weeks, or perhaps months. In rare cases it may even prove fatal. In the milder form, it is especially apt to appear very symmetrically upon the knees and elbows, and is most common between the fifteenth and twenty-fifth year of life. It is prone to recur in a patient who has once manifested it, but is not contagious. Often it is hereditary, and may be associated with a gouty or rheumatic taint in the system.

Treatment.—The treatment consists of careful attention to diet, avoidance of alcoholic stimulants, and the administration of arsenic in the form of Fowler's solution, five drops thrice daily. Externally soothing lotions or ointments are required in the first stage, and mild mercurial or tar ointments are of service after it has become chronic.

R.—Ol cade ..... 1 drachm
Lanoline ..... 1 ounce
Apply twice daily.

R.—Tar ointment ..... 1 drachm
Petrolatum ..... 1 ounce
Apply twice daily.

R.—Chrysarobin ..... 15 grains
Lanoline ..... 1 ounce
Apply to each spot twice daily.

PITYRIASIS (Scalp Disease).

Character.—Pityriasis is a squamous disease especially apt to affect the scalp when it appears in the milder form, giving rise to the shedding of an immense number of bran-like scales, resembling an exuberant crop of dandruff.

Treatment.—The condition of the health in general should be looked after. Iron and arsenic are given, also calcium sulphide locally for the scalp.

R.—Tr green soap ..... 4 ounces
Alcohol ..... 2 ounces
Dilute and use as a shampoo, if crust or scales. After removal apply

R.—Sulphur precip. ..... 1 drachm
Salicylic acid ..... 10 grains
Petrolatum ..... 1 ounce

Or,

R.—Tr Cantharide ..... 3 drachms
Tr capsicum ..... 3 drachms
Castor oil ..... 2 drachms
Bay rum ..... 3 ounces

WARTS, CORNS AND BUNIONS.

Hypertrophies of the skin are all unusual diseases, except warts and corns, which are common enough to make up for all the rest. The coming and going of warts on the hands is as much a mystery now as in former ages, when the most ridiculous remedies were gravely prescribed.

Wart Remedy.—Warts can be destroyed by caustics, of which nitric acid is the most severe and effectual, and chromic acid perhaps the least painful. When arising from the poison of syphilis, they are sometimes extremely sore and troublesome, so much so as to require removal by surgical operation.

Causes and Treatment of Corns.—Corns are similar to warts in their structure, except that they have a much thicker layer of epidermis over their surface. They are almost always produced by the pressure of tight shoes, and may be avoided by caution in this respect. They can usually be prevented from giving much trouble by carefully trimming out the centre of the corn at short intervals, or by wearing one of the various forms of perforated corn-plasters in common use. In cutting corn, the incision should never go through the epidermis, so as to cause bleeding, since dangerous inflammation has thereby been set up.

R.—Salicylic acid ..... ½ drachm
Ex. Cannabis Ind. ..... 10 grains
Collodion ..... 4 drachms
Apply daily for 3 or 4 days when the callous can be removed.

Bunion Treatments.—A bunion is generally made up of a corn on the side of the great toe, and an irritated synovial sac or bursa beneath it. It is also the result of wearing too tight a shoe, especially such as are too narrow at the point. When inflamed, it should be soothed with lead water and laudanum; a loose shoe, or one with a piece cut out of the side, being worn. After the reduction of the inflammation, benefit may be obtained

by painting with tincture of iodine. A bunion should never be neglected, as it is liable to suppurate, leaving a troublesome indolent sore, which may for years cripple the patient, even if permanent lameness does not result.

PRURITUS (Itching).

Character.—Pruritus is a very common disease of the skin, which is characterized by itching without any eruption or other apparent change in the appearance of the part affected. Children and elderly people are particularly apt to suffer thus, and the localities involved are generally those about the orifices of the body.

Causes.—Sometimes, like prurigo, it may be traced to the irritation caused by vermin, usually the pediculus corporis or body-louse, which may be gotten rid of by attention to cleanliness and the application of weak mercurial ointment, a tincture of larkspur, or various other home remedies. When not thus produced, the cause must be sought in some deterioration of the general health.

Treatment.—As local applications, lotions of borax, half an ounce to the pint, or of carbolic acid, one or two teaspoonfuls to the pint, and ointments of zinc camphor, belladonna or morphia are useful.

FRECKLES.

Freckles consist of a deposit of oxide of iron from the blood, just beneath the epidermis or in its lower layers. They may often be dissipated by painting with tincture of iodine or frequent application of peroxide of hydrogen.

DISEASES OF SKIN GLANDS.

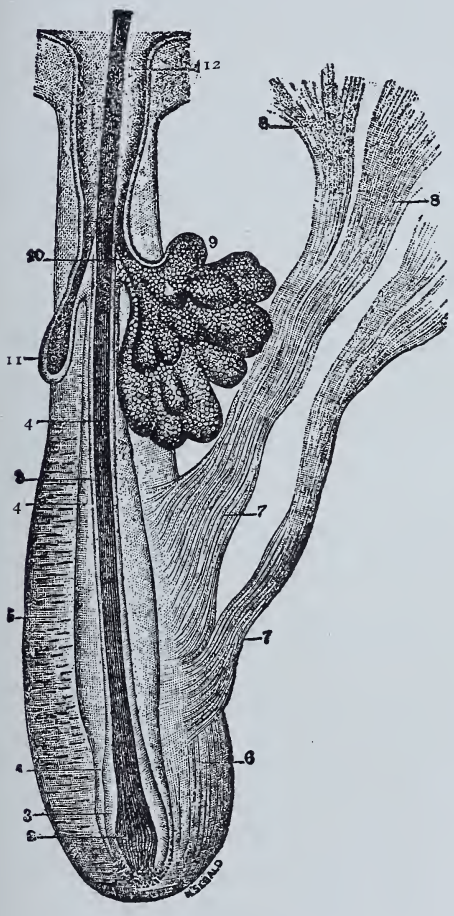
Seborrhea.—In seborrhea there is an excessive production of secretion, made up of oily matter and cast-off epithelial cells, which accumulates upon the surface in the form of thin, yellowish scales. It is especially common on the skin of young infants.

Treatment.—The layers of scales may be removed by the use of white castile soap and warm water, and if there is no inflammation of the skin, a mild carbolic or white precipitate ointment may be used to prevent their return.

Flesh-worms.—Acne, commonly called pimples or flesh-worms, coming, as it does, upon the face just at the time when young people of both sexes begin to feel most anxious about their personal beauty, gives rise

to a far greater amount of unhappiness than many of the serious maladies to which flesh is heir. It is an inflammation of the sebaceous glands of the skin upon the face and back, and elsewhere, which comes on in successive crops, and gives rise to the spotted and pimply countenances which are often so unsightly or even repulsive.

Description.—These sebaceous glands, one of which is well delineated in the accompanying wood-cut, are generally situated, as there indicated, by the side of a hair, and if inflamed, caused by the pressure they exert when distended, an inflammation of the surrounding derm constituting the pimple of acne. In the figure is exhibited a hair in its follicle, highly magnified. At 7 and 8 appear the curious little muscles which have the power of erecting the hair in conditions of sudden fright or horror. They are, as is well known, much more active in animals—for instance, the cat—than in mankind. 9 and 10 indicate a large, and 11 a small, sebaceous gland, both opening on the skin by the side of the shaft of the hair at 12. The small, black spot generally visible near the centre of an acne pimple is popularly supposed to be the head of a flesh-worm, which can be squeezed out by pressure at the sides of the papule. In reality, however, the yellow thread which looks like the body of a worm, is only the hardened secretion of a sebaceous gland, the top of which, being exposed to the air, has collected dust and dirt, and so become black.



A Magnified Sebaceous Gland.

Treatment.—No advantage is gained by squeezing out these little

plugs of fatty matter, as in most cases the bruising of the parts more than compensates for any benefit afforded by the relief of internal pressure in the pimple from retained secretion. A great many local applications for the cure of acne are offered for sale, some of which are composed of powerful poisons, and are liable to do great and permanent injury. A safe and often useful lotion is made of precipitated sulphur, variously combined with mucilage of sassafras-pith, glycerine and camphor; or an ointment of precipitated sulphur, with vaseline, a drachm to the ounce, or white precipitate with vaseline, half a drachm to the ounce, may be employed.

Accessory Treatment.—The most important part of the treatment is attention to any general derangement of health, especially of the digestive apparatus, or, in females, of the menstrual function. Internally one-quarter grain of calcium sulphide three or four times a day is often beneficial.

Diet.—Errors in diet will often bring out a crop of acne, and articles of food which contain fried butter or fat of any kind, appear to be apt to have this effect. Pastry of all varieties, particularly mince-pie, buckwheat and other hot cakes, sausage, cheese and nuts should all be avoided, as well as spirituous and malt liquors in every form. Although the treatment and hygienic care, as thus advised, will generally diminish the activity of the eruption, they may not always effect a cure, and consolation must be sought in the fact that it seldom persists unless kept up by imprudence, after the period of maturity in the organism has been attained.

SKIN DISEASES DUE TO VEGETABLE PARASITES.

Causes.—It is now generally admitted that the fungus growths found so constantly in and among the epithelial scales of the epidermis are the causes, and not the mere accompaniments, of a curious group of skin maladies. The development of fungus not only invades the skin, but affects also the hair and the hair-follicles. Though the variety of vegetable growth differs in the different diseases, each presents the same general features, consisting of microscopic threads named mycelium, corresponding to the stem of a larger plant like a grape-vine, and microscopic seeds sometimes produced in bunches like grapes, and called spores. The full recognition of the fact, as it is believed to be by the present writer, that the fungous growth is the essential cause of the whole disease is vitally important, because upon it depends the system of preventing

these maladies from spreading to healthy persons, by total destruction of the spores or seeds of the respective diseases.

A Case in Point.—In the instance of a member of the author's family, a little girl was infected with the fungus of Favus just underneath the tip of her chin, probably from spores left by some diseased child on the sill of a car window, from which she had been looking out, and at the time of being attacked with this complaint, which was fortunately recognized at once, and put an end to by appropriate treatment, she was in perfect health.

RING-WORM OF THE HEAD.

Symptoms.—Tinea tonsurans or ring-worm of the head is the most common of these vegetable parasitic diseases. It shows itself as a dry, scaly patch, rounded or oval in outline, which gradually grows larger and larger, the hairs dying and dropping out at the centre, so that ultimately a bald spot of from half an inch to two inches in diameter is left. The same fungus which produces this malady in the head sometimes develops among the hair of the beard, producing what is called tinea sycosis or barber's itch, and upon the other parts of the body where it is denominated tinea circinata or common ring-worm, with which. however, no worm has anything to do.

The Effect of Ringworm on the Hair.

Further Symptoms.—Ring-worm of the scalp commences usually as a little pimple, which soon spreads and takes on its characteristic ring-like appearance, showing a circle of minute scales, pimples and vesicles at the circumference of the patch. As the disease advances the hairs included in the circle become dull, dry, twisted and easily broken off, whilst the epidermis and stumps of the hairs become covered with a greyish-white powder, consisting chiefly of the vegetable growth.

Illustration.—If one of these broken hairs is put into a drop of caustic potash solution, and examined under a high power, such as 250 diameters of the microscope, its shaft can be seen as represented in the figure, penetrated with the mycelium of the fungus, called the tricophyton tonsurans, and floating around may often be detected separate spores of the same plant as indicated at the upper part of the wood-cut on both sides of the hair.

RING-WORM OF THE BODY.

Tinea circinata, which is also denominated herpes circinatus and ring-worm of the body, begins like that upon the head with a small pimple, but soon spreads with great rapidity, and the rings of eruption may attain a diameter of four or five inches.

Characteristic.—The great characteristic by which this affection can almost always be recognized is its healing up in the middle, so that the appearance is presented, after a time, of a patch of healthy or slightly reddened skin, surrounded by an angry, red ring about a quarter of an inch wide. Such an arrangement of the eruption is peculiar to ring-worm and suggests that the fungus in its growth at the centre of the ring has exhausted some material found in the skin which is necessary for its development. Were this not the case it would almost certainly continue to flourish in the middle, as well as at the edges, so that the course of ring worm affords a strong argument in favor of that part of the germ theory which supposes that the immunity conferred by one attack of small-pox, for instance, is due to the exhaustion in the entire system of some ingredient necessary to the growth of the specific small-pox fungus.

BARBER'S ITCH.

Character.—Tinea sycosis, or barber's itch, is the variety of the disease in which its vegetable cause happens to develop upon the chin of an adult, male patient. A great amount of irritation is usually set up, perhaps, from the roots of the hairs constituting the beard, extending more deeply into the substance of the true skin, and the plant therefore producing a deeper-seated inflammation of the parts as it grows down along the sides of the hair-follicles, than in the non-hairy portions. Hence large papules, and even pustules resembling those of acne in its aggravated state, are apt to be formed, and the itching and burning, as well as the disfigurement, are occasionally very troublesome to the patient. Perhaps among the vegetable parasitic diseases there is none to which persons are more liable to be exposed than this tinea sycosis or, as it is commonly called, the barber's itch.

Causes.—As before observed, any one of the innumerable epidermic scales, continually shed from human integument and constantly floating in the atmosphere around us, whence they are deposited with other materials in the form of dust, may be freighted with spores, or seeds enough

of the fungus which causes tinea, to infect thirty, forty or fifty individuals should they meet with proper conditions for growth and reproduction. If persons fully realize this truth they can, of course, readily understand that all the ordinary precautions usually resorted to in barber's saloons, to wit, those of having separate cups, razors and brushes for each individual customer only diminish the danger of infection, and by no means insure a certainty of escaping the disease. For not only is the air of the room liable to carry separate epidermic scales, which may each convey the infection, but many of the operations connected with the process of shaving are still more likely to be the means of communication. For instance, the razors which are employed, even if they be individual property, are all sharpened with the same strap, upon which may have been spread, a few moments before you enter to be shaved, a few score epithelial cells from a case of tinea, one or two of which, should they accidentally adhere to the surface of your razor, as it certainly is quite possible for them to do, would be amply sufficient to implant the disease upon your face. In like manner the towels which are used, the brushes and combs, and even more certainly the hand of the barber himself, may prove the most efficient carriers of contagion which could possibly be devised.

Precautions.—In order to prevent the spread of these vegetable parasitic diseases the precautions already suggested must be rigidly enforced. All articles of clothing which have been worn in contact with parts of the body where the parasite grows should be purified by immersion in boiling water, or, if the nature of the material does not permit this, by baking at a heat of 250° Fahrenheit. All bed linen, bandages, brushes, combs and towels, or other articles suspected of similar contact, should be treated in the same way; and, of course, should be used by no other person until thus purified. The patient, if a child, should be kept by itself as far as possible, and those having charge of the case should thoroughly wash themselves after handling the parts affected. It is probable that the use of a strong carbolic acid soap, or of sulphite of soda or chlorinated soda solution would add to the security against attack, and with such precautions there is little danger that the malady will be transferred to others. Of course after proper treatment has once been put into operation, the danger of infection is still further diminished.

Treatment.—1. The essential point in treatment is to apply to the roots of the hairs a preparation which will kill the fungus, just as weeds are destroyed in an asparagus bed by sowing the ground with salt. In

order to do this, the hair—if any exists—should first be removed, and the surface made as clean as possible. When the hair is not very thick, or has already been nearly destroyed by the disease, a cure may perhaps be effected by lotions or ointments of sulphuric acid, carbolic acid or salicylic acid. An ointment of verdigris is a favorite home remedy, and often succeeds after causing a good deal of unnecessary irritation.

2. Tincture of iodine, applied twice a day for fourteen days, and the spot then covered with the ointment of corrosive sublimate, of about two grains to the ounce, is an effectual method of treatment, which may be employed with great caution in obstinate cases, or the following solution applied at night: Hyposulphite of soda, one drachm; water, one ounce. Where the hair is very thick and strong it is sometimes necessary to pull it out with tweezers, as will be directed in speaking of favus, although this severe operation is, happily, not often required.

SCALD HEAD.

Character.—Tinea favosa or favus, called also scald head and honeycomb ring-worm, is characterized by its peculiar dry, sulphur-yellow crusts, in the form of little cups about a quarter of an inch in diameter. In advanced cases, however, these cups run together, so that their well-defined form can, perhaps, with difficulty, be recognized, except at the edge of a patch. A peculiar mouse-like odor is emitted from a child's head bearing a good crop of favus, this being probably produced by the spores of the fungus coming in contact with terminal branches of the olfactory nerve of the observer. On careful inspection, each cup is usually seen to surround a hair, and there is commonly little trouble in detecting the fungus spores and mycelia on microscopic examination.

Causes.—Although this disease is more frequently met with upon the heads of neglected, ill-nourished children than elsewhere, there is little doubt that any one of these spores of the achorion schœnleinii, as the fungous cause is denominated, might, under favorable circumstances, germinate and give rise to an abundant crop of favus in the hair, beard, or skin of the most vigorous individual upon whom they happened to be deposited.

In some cases the fungus of favus attacks the nails, developing beneath them and by the pressure which it causes producing their absorption and perforation. Much local inflammation about the root of the nail is thus set up.

Treatment.—The treatment of favus consists in removing the crusts by softening with a poultice, cutting or shaving off the hair, and then rubbing in thoroughly sulphur or tar ointment. If the spot is small a weak solution of corrosive sublimate may be painted over it, but this powerful poison requires very careful management. In obstinate cases it may be necessary to pull out the hair, either by the process of avulsion, where a cap made of adhesive plaster is suddenly torn off the head, bringing the hair with it, or by extracting six or eight hairs at a time with tweezers. This latter operation, called epilation, is denominated by Sir E. Wilson "the purgatory of avulsion," and condemned as little less cruel.

Brown Patches.—Tinea versicolor or chloasma depends on the growth in the epidermis of a fungus similar to that of ring-worm, but bearing its spores in heaps like bunches of grapes. The disease, which is seldom troublesome, is characterized by brownish-yellow, slightly scaly, irregular patches, which appear on the front of the chest and sides of the neck. It may also affect other parts of the body. As it does not penetrate deeply into the epidermis it is easily cured by painting with tincture of iodine, tincture of chloride of iron, or solution of sulphurous acid.

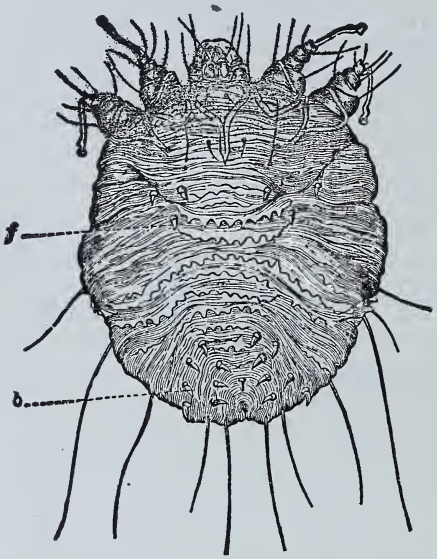
ITCH (SCABIES OR CHIGGER).

Causes.—Scabies or the itch, the most important skin disease caused by an animal parasite, was called in former times, when its true cause was but little understood, the seven-years' itch, because it was so hard to cure. At present it is universally admitted that the whole cause of this most annoying malady is the itch insect, or itch-mite, which is represented in the cut on the next page as it appears under the microscope if magnified about two hundred diameters. From the irritation set up by the parasite, and still more from the scratching to which it drives the unfortunate patient, vesicles, pimples and pustules are formed and grouped together in every variety.

Symptoms.—1. The itching, which is terribly severe even in daytime, is generally much worse at night after becoming warm in bed. The favorite haunts of the insect upon its human domain are the hollows of the elbows and knees, the front of the wrist and the backs of the hands just below the roots of the fingers; but it is also found in other portions of the body where the skin is tender. The palms of the hands and the soles of the feet are not infrequently infested, notwithstanding the integument is thick in these parts. In a vast majority of cases showing the

discrete or separate eruption on the palms and soles it is due to either scabies or syphilis, and the presence of itching in the former and its absence in the latter of these two diseases enables us to distinguish them with great certainty.

2. The accompanying eruptions of scabies vary somewhat in their character according to situation. Thus the prurigo of itch is generally best defined upon the forearms, the lower part of the abdomen, and the upper and inner portion of the thighs. A vesicular eruption is more frequent about the fingers and breasts of thin-skinned people, and pustules are met with in children especially on the hands, feet and hips.



The Itch Insect Magnified Two Hundred Times.

3. In searching for a specimen of the insect, which can be seen quite distinctly with a good magnifying glass, it is well to look for one of the pimples, which has, extending from it, a little whitish line about an eighth of an inch long and generally somewhat curved. This is the burrow of the female insect, in which she has laid her eggs and is raising a happy little family to follow her example and live off the fat of the land they inhabit. If the top of the burrow is scratched through very carefully at its outer end with the point of a fine needle, and then the tiny round dot which may be found there picked out on the needle and transferred to a slip of glass, positive evidence of the nature of the disease can be at once detected by suitable examination under a microscopic or hand-magnifier.

Illustration.—The adjoining figure represents one of these burrows of the acarus scabies or itch insect, and in it is seen the mother of the family at the upper extremity, whilst eggs and young in various stages of development are depicted in different portions of the gallary excavated for their accommodation in the epidermis of their hospitable host.

Treatment.—The treatment of scabies should be by applications which, whilst they tend to kill the insects, will increase as little as possible the irritation of the skin. If this irritation is not already too great, the

patient should go into a warm bath and scrub himself with brown or soft soap for half an hour; he should then lie in the bath for another half hour, and after being thoroughly dried, rub himself with the compound sulphur ointment all over, except the head, for twenty minutes, allowing the ointment to remain on the body all night. This whole process should be repeated every night for three times, which will probably end the lives of the itch insects and so terminate the malady.

The Burrow of the Itch Insect.

Disinfection.—In order, however, to avoid being reinfected from the clothing upon which some of the acari or their eggs may remain, every article that will bear washing should be thoroughly boiled, and those pieces of apparel which would be injured by water should be several times pressed with a hot iron, so as to completely destroy the parasites.

Further Treatment.—When the skin is very irritable the application of Peruvian balsam or the styrax ointment should be tried at first, and it ought to be remembered that even in those whose skins are not remarkably tender the sulphur ointment, if used very vigorously, is apt to produce an eczematous eruption, which, however, quickly subsides on the cessation of the application.

LICE.

Treatment for Lice.—The three kinds of pediculi or lice which infest the head, the body and the pubes of man, differ in their appearance under the microscope, being apparently each best fitted for the special part it has to play in tormenting the human family. They can all be defeated in this great business of their lives by strict attention to cleanliness, frequent bathing, and the application of mercurial ointment diluted with five times its bulk of lard. For the purpose of avoiding salivation, this oint-

ment should not be used directly after a bath, nor rubbed in very strongly, nor, in fact, allowed to remain in contact with the skin any more than necessary, or a one to one thousand solution of bichloride of mercury may be applied.

PART XII OF BOOK IV

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CURATIVE MEDICINE

PART XII.

DISEASES OF THE BONES AND MUSCLES

Bones.—The skeleton is the framework of the body, and is composed of an articulated assemblage of hard organs, the bones.

It serves to preserve the shape of the body; forms cases for the protection of the vital organs, and gives attachment to muscles and forms levers of movement.

Number of Bones.—The number of distinct pieces or bones composing the skeleton varies at different periods of life. Some remain distinct from the first moment of their development, such generally being of the simplest form, such as the bones of the carpus or wrist, and the patella or knee cap. Others, which are viewed as single bones in the adult, not only consist of several pieces in the beginning, but in the progress of development have other pieces successively added, as in the case of the vertebræ or bones of the spine and the thigh bones.

May Unite Bones.—Again bones considered as distinct pieces when the body has arrived at maturity, at a later period may become united with those which are contiguous, as in the coössification of the cranial bones. Therefore in the adult skeleton the number of bones to which we usually refer are two hundred and six, exclusive of the teeth and sesamoid and wormian bones, which are not uniform in number. Of this number twenty-six are found in the backbone or spine; twenty-two in the skull and face; the ribs count twenty-four, twelve on each side, whether the person be man or woman; each arm has thirty-two bones, and each leg has thirty. These bones vary very much in size, shape and thickness, and all have been named and described with great minuteness by anatomists.

Composition of Bones.—The bones under every modification of shape and mechanical arrangement are constituted by precisely the same elemen-

tary matters, the principles of which are an animal and an earthy substance, in intimate combination.

Phosphate of lime is the most abundant mineral material, being about 51 parts in the 100 of bone. Carbonate of lime, 11.3 parts; fluoride of calcium, 2 parts.

The animal matter of bone is gelatinous, allied to cartilage; originally every bone is developed from cartilage by ossification.

The mineral matter of bone increases with age; making bones of the old more brittle. There is more of it also in some bones and parts of bones than in others.

Structure of Bone.—A good idea of the structure of a bone may be gained by picking the second joint of a chicken or turkey clean, and then sawing off about an inch of the upper end and splitting this piece in half lengthwise with a hatchet or strong knife. This thigh-bone of a turkey corresponds to the femur or thigh-bone in a human being, where it lies near the centre of the leg and reaches from the hip to the knee. Its upper end may be recognized by its having upon it a single round knob, which formed part of the hip-joint.

Marrow of the Bone.—On examining such a bone it is found to be hollow in the middle, and partly filled with a fatty substance called the marrow of bone. In this marrow run important little blood-vessels, which carry the blood to nourish the bone, and from it they pass and repass to minute channels running lengthwise in its substance, which are called the Haversian canals, after the name of the physician who first discovered them. In dried bones, and especially when they have undergone prolonged bleaching in the open air, such as those of a long dead horse or cow, these Haversian canals may be readily seen, looking like fine pores in the broken ends of the bones.

Telescopic View of the Canals.—Under the microscope they are discovered to be encircled with rings of lacuna, or little holes in the bone substance, each of which communicates with its neighbors by very minute branching tubes. During the life of an animal the lacuna are filled with soft, jelly-like bone-corpuscles, but in dried bones these gelatinous bodies shrivel up, leaving the lacuna empty, except of air, which, by refracting light differently from what the solid bone does, makes the lacuna look like black dots under the microscope.

Bones of a Chicken.—If the breast-bone of a young chicken is examined it will be found that its smaller end is made up of the tough, milk-white or semi-transparent substance called gristle or cartilage. When a

chicken is first hatched nearly all its bones are chiefly composed of cartilage, and as it grows older they gradually become more and more ossified, that is, changed into bone. But certain portions of the body commonly remain cartilaginous through life, as, for instance, the gristly bands which fasten the ribs to the breast-bone, and the rings of the trachea or windpipe.

Bones of Arm.—The bones of the arm, counting from the shoulder downward as it hangs at the side, are first the humerus or arm-bone, which extends to the elbow, and next the two bones of the fore-arm, which make up the part from the elbow to the wrist, and are named the radius and ulna. The latter of these two bones projects on the under side of the arm, and the radius has the hand attached to it, and is rolled part way around the ulna every time the hand is turned over from the position of pronation, or lying with its palm downward, to that of supination or lying upon its back. This is a very important movement, and great care must be taken by the use of properly padded splints to save it, when the radius and ulna of the fore-arm are fractured by accident, as very frequently happens.

Bones of Wrist.—The wrist or carpus is composed of eight small bones, each with a hard name derived from Greek or Latin, and the palm of the hand is formed by four of the metacarpal, a word meaning beyond the wrist bones, the metacarpal bone of the thumb making the fifth. The bones of the fingers consist of three rows of phalanges, the thumb having two phalanges only.

Besides the bones mentioned, anatomists reckon the shoulder-blade, or scapula, and the collar-bone, or clavicle, as belonging to the arm, or, as they name it, the upper extremity.

Kinds of Joints.—The joints of the arm exemplify the two chief kinds of articulation made use of in the human body, namely, the ball and socket joint, of which the shoulder is an example, and the hinge-like joint, of which the elbow is a good illustration. The joints between the metacarpal bones and the first row of the phalanges of the fingers, that is, those at the roots of the fingers, are imperfectly formed ball and socket joints, and allow, as anyone can see in his own hands, of a good deal of lateral or sidewise, as well as backward and forward motion. The other articulations of the fingers are hinge-joints, and like the hinges of a gate, permit only of a back and forth motion.

The Synovial Fluid.—The ends of bones where they rub against each other inside the joints are covered with firm smooth cartilage, and to diminish the friction as much as possible these polished surfaces of cartilage are kept slippery by a peculiar liquid named the synovial fluid

PARTS OF THE HUMAN SKELETON.

Top Central Plate.—This shows the bones of the cranium, or head, eight in number. The large frontal bone forms the forehead. The articulation of the teeth are prominent. It also shows the facial bones, or those of the face, fourteen in number.

Middle Central Plate.—This shows the bones of the chest; the sternum, or breast bone, in the centre; the ten true and two floating ribs on either side, and part of the backbone, to which the ribs are attached.

Lower Central Plate.—This plate shows the bones of the pelvis. Pelvis means basin. It is the basin or girdle by which the bones of the lower body, as the hip bones, are joined to the upper. The two large side bones are the os innominata, or unnamed bones. The central triangular bone is the sacrum, a composite bone, forming the union between the vertebræ and os coccyx, or tail end of the backbone.

Upper Left-Hand Plate.—This represents the eight bones of the carpus (wrist); the five of the metacarpus (between wrist and phalanges), and fourteen bones of the phalanges (battle rank bones), twenty-seven in all.

Next Figure Below.—This is the sacrum, detached from the pelvic girdle. It is also seen in lower middle plate. It is called sacrum (sacred), because it was of old offered up in sacrifices.

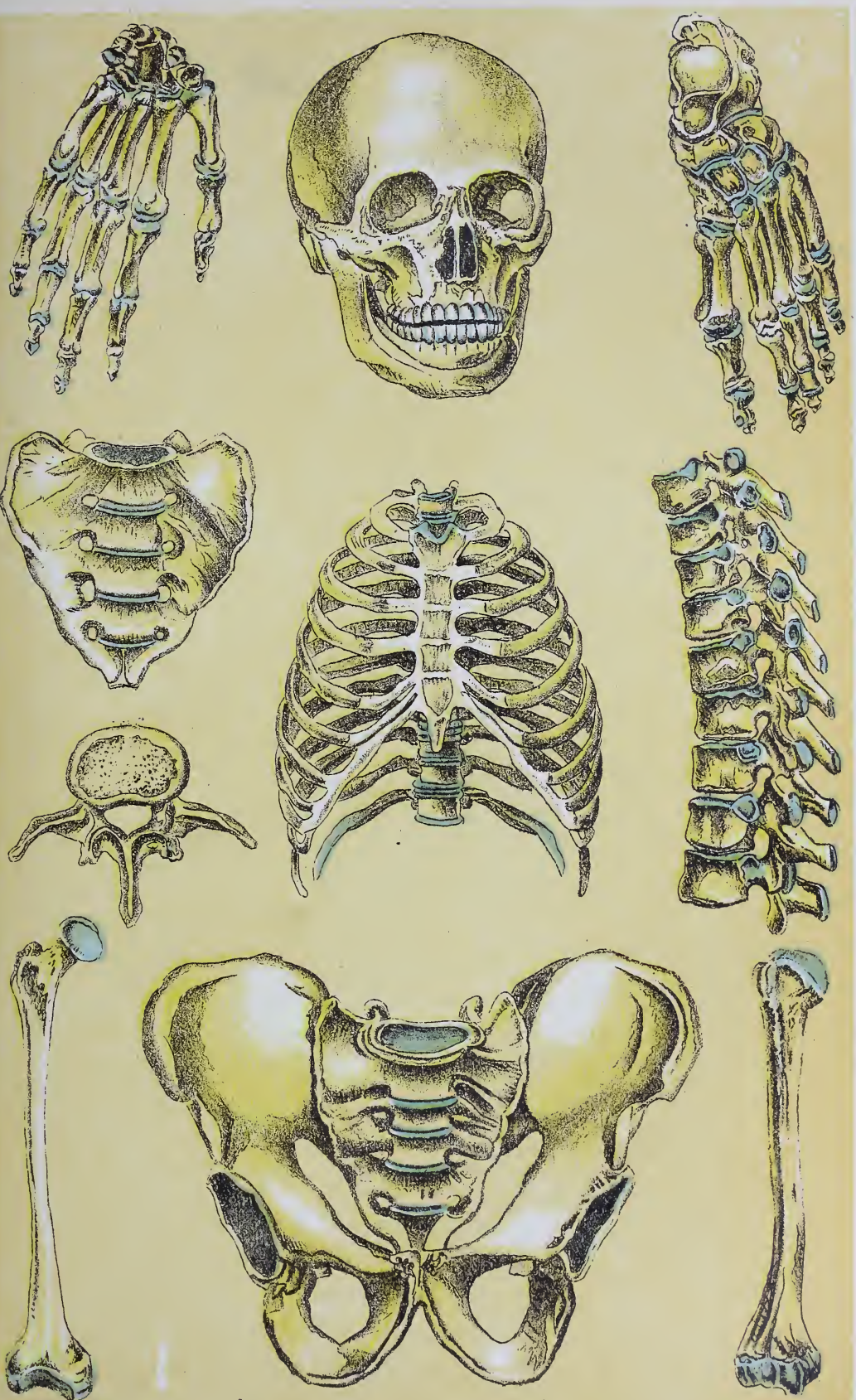
Third Left-Hand Figure.—This is a section, or single joint of the backbone, or spinal cord.

Bottom Left-Hand Plate.—This represents the femur, or great thigh bone. It is cylinder-shaped, and the largest, longest and strongest bone in the body.

Upper Right-Hand Plate.—This represents the bones of the foot. They are divided into three classes. 1. Tarsus, or ankle bones, seven in all. 2. Metatarsus (between tarsus and phalanges), five in all. 3. Phalanges (battle-rank bones), fourteen in all, a total of twenty-six foot bones.

Middle Right-Hand Plate.—This represents a part of the backbone or spinal column. It consists of a series of vertebræ, within which is the spinal cord or nerve, to injure which means paralysis or death.

Lower Right-Hand Plate.—This is the humerus (shoulder), or bone of the upper arm. It is the only bone in the upper arm, and it revolves on the scapula (shoulder-blade) above, and the ulna and radius of the fore-arm below.



Parts of the Human Skeleton.

or "joint-water." This synovial fluid, called also the synovia, acts the part of oil to a door hinge, and when sometimes in old people the synovia becomes scanty, their joints will creak and grow stiff, just as the hinges of a door do for want of oil. The ends of the bones in a joint are held in place by a tough, firm wrapper, called the capsular ligament, which encloses them tightly on all sides, and also prevents the synovia from escaping and being lost.

Bones of Leg.—In general arrangement the bones of the legs are very similar to those of the arms, making allowance for the difference in function of the two pairs of limbs. The thigh-bone or femur is the longest and strongest bone in the body, as might be expected from the larger share of work in walking, running and leaping it has to perform. It is articulated (or jointed) to the pelvis at the lower corner of the body by the hip-joint, a ball and socket articulation, which allows of considerable movement in every direction.

Knee to Ankle.—From the knee to the ankle, the leg, like the forearm, is furnished with two bones. One of these, called the tibia, is the shin-bone, forming the front of the leg and the inner side of the ankle, that is, the side next the other limb. The bone on the outer side of each leg and each ankle is named the fibula, and is much smaller than the tibia, its partner in the business of supporting the weight of the body. The ankle or tarsus is composed of seven bones instead of eight, as are found in the carpus, and it is articulated below and in front, near the middle of the foot, with five metatarsal bones. At the front, ends of the metatarsal bones are jointed on the toes, each with its three rows of phalanges, except the great toe, which, like the thumb, has but two.

Nature of Sprains.—The ankle-joint is more apt to be "sprained" or "strained," than any other, and this accident, therefore, requires a few words of explanation here. A strain of a joint is the result of moving the bones which compose it too far, or in an unnatural direction, so that the capsular and other ligaments are stretched or perhaps torn a little by the force applied. A strained joint is very painful, apt to swell rapidly, and often proves troublesome for months, or even years, if not properly treated. Until a doctor comes, the injured articulation should be placed in an elevated position, so that the blood will drain away from it, kept perfectly quiet, and covered with cloths wrung out of hot or cold water, so as to reduce the danger of inflammation.

Bones of Skull.—The bones of the skull or cranium are broad, comparatively thin, and curved in such a way as to make a hollow case or

oval box, shaped a good deal like an egg, for the protection of the brain, which is placed inside of them. The most important are the frontal or forehead bone, the two temporal or temple bones and the occipital bone, which is at the back of the head. These bones are united together by seams or sutures, consisting of a curious kind of dove-tailing, which fastens them so firmly together that, in their natural state, it is impossible to get them apart without breaking them.

Character of Skull Formation.—The arch form of the skull makes it much more capable of resisting blows upon the head; but if these are so severe as to fracture the bones, especially if they are dented in so as to press upon the brains, unconsciousness is often very quickly produced. This would happen much more frequently were it not for the layer of spongy matter interposed between the hard plates which form the cranial bones.

Bones of the Face.—The bones of the face are comparatively light and thin, except the lower jawbone, into which are set the lower teeth, and which is the only bone about the head which is furnished with a movable joint, except the occipital bone, where it rests upon the neck.

Bone of Spine.—The spine or backbone is made up of twenty-four vertebræ, the sacrum and the coccyx. These latter bones seem to be each composed of several vertebræ, which, for the purpose of being rendered stronger, have grown fast together. The uppermost vertebræ is called the atlas, because upon it the head is supported; and the second is named the axis, because upon it the atlas, and with it the whole head, turns, as in shaking the head negatively. The upper seven vertebræ are called the cervical or neck bones; the next twelve are designated as the dorsal or back vertebræ; and the last five are named the lumbar vertebræ or vertebræ of the loins. These twenty-four bones are fitted together in such a way as to form a continuous tube, which receives and protects the spinal cord or spinal marrow just as the upper continuation of the spinal cord—that is, the brain—is encased and protected by the bones of the skull. The vertebræ are jointed so as to allow considerable motion, both sideways, forward and backward, and have between each pair a cushion of fibro-cartilage, which serves to preserve the brain from injury by the shocks and jars which would otherwise be given to it in jumping, running and various other movements. The sacrum, which is continuous with the vertebræ, is united with two large, flat and irregularly-shaped bones, to form the pelvis or basin at the lower part of the trunk. The pelvis supports the spine and the organs in the abdominal cavity, and is in its turn

sustained on each side by the thigh bones, which prop it up at the hip-joints, as already indicated.

Bones of the Thorax or Chest.—The heart and lungs are protected by a bony cage composed of the twenty-four ribs, which lie a little beneath the skin of the thorax or chest and in thin persons can be easily felt at the sides or near the breast-bone. This breast-bone or sternum is situated directly in the middle or front of the thorax and has the front ends of the ribs attached to it by cartilages, named the costal or rib-cartilages, which allow of the outward and upward movement of the ribs, necessary in breathing.

The back or posterior ends of the ribs are jointed on to the vertebræ of the spinal column in such a way as to allow of needful motion, and yet secure sufficient stability and firmness.

Dislocation of Bones.—When a dislocation occurs, or, as it is commonly called, a bone is put out of joint, the bones composing an articulation have been pulled or twisted so hard as to displace them, breaking some of the ligaments which are arranged to keep them in their proper positions.

Example of Dislocation.—Generally, a person whose arm, at the shoulder, for example, is dislocated, suffers a good deal of pain and loses the use of the limb until the bones are put back in their places again, or as it is called, the dislocation is reduced.

A dislocation is one of the heavy penalties people often have to pay for imprudent over-exertion in lifting and wrestling, or for carelessly letting themselves have falls and hard knocks, or becoming entangled in railway accidents.

Repair of Fractures.—The repair of broken or fractured bones is a wonderful process of nature, in which a material called callus, at first like putty, is formed around the broken ends, holding them together, feebly at first, but afterward it gradually hardens, uniting them more firmly indeed.

Since this "knitting" of the broken bones may occur in almost any position they happen to lie in, or are pulled into by the irritated muscles in the neighborhood, it is evidently very important that they should be put and kept in exactly the right place. For this purpose there are many ingenious splints and bandages devised and used by surgeons. See Accidents and Emergencies and Surgical Diseases.

DISEASES OF THE BONE.

Inflammatory Affections.—These sometimes follow wounds, but are more common as result of syphilitic or scrofulous disease. There is swelling and pain of affected part (especially at night). Unless overcome in early stage, necrosis is apt to follow.

Necrosis.—This disease is akin to mortification of the flesh and is sometimes called Death of the Bones. It may occur from injuries to and inflammation of the periosteum or may be due to phosphorous poisoning. There is dull, deep-seated—sometimes acute—pain, followed by increase of size and the formation of new bone around the old. There is tenderness and distension and a breaking down of tissue with a discharge of pus and of small particles of bones. Blood poisoning frequently ensues from absorption of dead bone tissue that has not found outlet. To prevent this an incision should be made over a swelling in bone troubles if pus be suspected and thus permit escape of diseased parts. This should only be done by a skilled surgeon and under thorough antiseptic conditions. Temporary relief is obtainable by poultices and quieting fomentations. Surgery is usually necessary, all diseased bone being scraped away.

Nodes.—These are hard, bony swellings, which are apt to occur as tertiary symptoms of constitutional syphilis. They are most common in long bones and are frequently found on the front surface of shin-bone. They are often painful for a time, particularly at night, but yield promptly to treatment with the iodide of potassium in the majority of cases.

Softening of Bone (Osteomalacia).—This is an uncommon disease observed in adults; seldom seen in males, occurring in greater frequency in females. It is characterized by a softening of the bones, rendering them very liable to break or bend on the application of little force; resulting from absorption or deficiency of the earthy matters in the bones.

Brittleness of Bone (Fragilitis Ossicum).—This is an affection of bone in which the inorganic are out of proportion to the organic constituents, rendering the bones brittle; there is an apparent increase of the earthy matters, with a diminution of the vascularity of the bone. Children and young persons seem to suffer most from this disease, and in many instances an hereditary tendency can be traced.

Osteoma (Chondroma).—The bones are subject to tumors, to cartilaginous or other growths. They form hard rounded tumors, fixed to their point of origin. They may attain a huge size—but are usually small.

They grow slowly without pain or other symptoms except such as may be caused by their bulk or pressure, and interfere with the functions of neighboring nerves.

Osteomata are liable to inflammation and necrosis, but never undergo malignant or cancerous degeneration. Chondromata may not only become inflamed, and necrosis and sloughing follow; but it becomes cancerous in some instances; for instance, after an injury to a bone, a chondroma may appear and develop with terrible rapidity, and upon its removal may return, become cancerous and form secondary tumors elsewhere.

Treatment.—If osteomata or chondromata are removed whilst small the operation is to be recommended, but when left until a huge tumor has developed, of the nature of which no doubt can be entertained, any interference is of questionable propriety.

Synovitis.—Among the important diseases of the joints must be mentioned synovitis or inflammation of the lining membrane, by which the synovia or joint-water is secreted. This disease, usually attended with severe pain, and when the joint is a large one accompanied with much constitutional disturbance and fever, appears in two forms, the acute and the chronic.

Causes.—The acute form is usually the result of injury, which may be very slight in its character, as even the least puncture of the joint by which air can enter is liable to produce it. Acute synovitis runs its course in ten or twelve days, causing much swelling and severe suffering on the slightest movement of the limb to which the joint is attached. The chronic form is commonly a continuation of the acute, and may itself result in softening and what is called pulpy degeneration of the synovial membrane.

Treatment.—The treatment of synovitis is by free leeching of the affected part; perfect rest in bed, with the limb elevated and secured in a splint if needful; low diet with saline purgatives, such as epsom salts or seidlitz powders, and anodynes to relieve pain. In the chronic form small blisters and painting with tincture of iodine are likely to prove useful. Inflammation of the synovial structure of the joints is apt to take on a rheumatic, scrofulous or syphilitic character in persons who are constitutionally under the influence of these taints. In such instances the appropriate treatment for them, as already pointed out, is to be associated with that for ordinary synovitis.

Ulceration of the cartilages may occur in a joint as a consequence of

long-continued inflammation, causing intense pain, and usually disabling the limb. Its liability to occur renders the prompt treatment of synovitis doubly important.

Abscess (Coxalgia).—Abscess within a joint is rare in healthy persons, but in the scrofulous it is by no means uncommon, and in strumous children abscess in the hip-joint, causing the lamentably frequent affection, coxalgia, is a malady of much importance.

Treatment.—The general treatment in these sad cases is that already indicated for scrofula, but the local trouble should be immediately attended to by an experienced surgeon, and remedied as far as possible by the aid of the complicated apparatus devised for the purpose.

Pott's Disease.—This consists of a tubercular inflammation of the bodies of the vertebræ or spinal bones, and their cartilages; and is most common in children between two and ten years of age, although it may occur at any age. In some cases the affection appears to follow a slight injury to the spine in those of tubercular or strumous tendencies, in others the disease develops without apparent exciting causes.

Symptoms.—Rigidity of spine, tenderness and local pain are the prominent early symptoms. Abscess may occur early, but is most common in the late stages. Deformity or spinal curvature usually occurs as a result of the disease process, depending upon the amount of breaking down in the bones and the falling together of the vertebræ, and may be gradual or rapid in its development. Treatment is as indicated in article on Coxalgia.

THE MUSCULAR SYSTEM.

Muscular Function.—The power which moves different parts of the frame, according to the directions of the will, as, for instance, the legs, in walking, is produced by the contraction of muscles. These muscles form the lean meat of animals and of the human body, and, except in very fat people, make up a larger portion of the bulk of the frame than any of its other constituents.

Composition.—They are composed, as is readily seen in a piece of fresh beef or mutton, of long strings of reddish material, which, under the microscope, are found to be made up of a multitude of fine, beaded threads, arranged in small bundles, and called the ultimate muscular fibres. They exercise power in moving the limbs, and so forth, by shortening up or contracting when excited by the nervous fluid, sent to them through the nerves from the brain, as ordered to do so by the will.

Mechanism.—The exact mechanism of moving the arm, for instance, by the process of contraction, may be easily understood from the picture shown on page 752, in which it is readily perceived that the shortening up of the muscle must pull up the hand, bending the arm at the elbow-joint, and changing the position from that represented in the second, to that shown in the third figure. Precisely the same kind of operations accomplish the motions of lifting the feet in walking or climbing, swinging the arm in throwing a ball, opening and shutting the mouth, and, indeed, of most of the voluntary movements of which we are capable.

Voluntary and Involuntary.—But whilst many of the muscles are controlled by the will and are, therefore, called voluntary, many of them are not so ruled, and hence have received the name of involuntary.

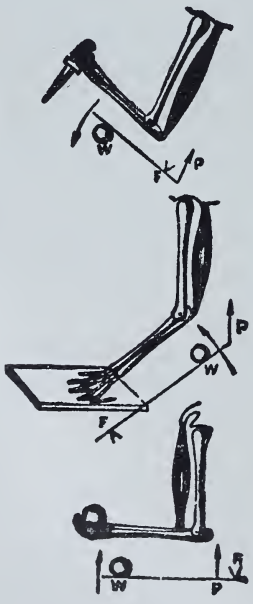
Most Important Involuntary Muscles.—Among the most important of the involuntary muscles are the heart, the intercostal muscles, the muscles between the ribs which help to expand the lungs in respiration, and the muscular fibres of the alimentary canal, which aid in pushing along the food in digestion. Fortunate is it for us that such is the fact; for otherwise, when our wills were off duty, as in sound sleep, the operations of these vital organs would stop, and life, which depends upon them, soon cease.

Muscular Attachment.—The muscles are usually attached to the bones, and move them by sinews or tendons, which are made of white, fibrous tissue, the strongest and most flexible material in the body. These tendons are like long, round, white cords, such as may be seen in the lower part of the leg of a chicken. The largest tendon in the human body is that of the heel, called the tendon Achilles, which is the continuation of the big muscle of the calf of the leg. This powerful muscle is used in jumping and, since it acts at a great disadvantage, is necessarily very strong in order to be able to throw the entire body forward, as in making a leap.

Origin and Insertion.—As a general, but by no means universal, rule, a muscle has one attachment which is fixed, commonly spoken of as its origin, and a second, called its insertion, upon which it acts by drawing it toward the origin when the muscular substance contracts. Muscles mostly pass in a straight line between their two attachments, but sometimes they act around an angle by sliding over a pulley, or by means of a small bone in the tendon, like the knee-pan. The muscles are so attached that they are always slightly on the stretch, and thus, at the moment they begin to contract, they are in an advantageous position to bring their

action to bear on the bones which they move. When the contraction ceases, the bones are drawn back to their former position without any sudden jerk.

Muscular Leverage.—The muscles commonly act upon the bones as levers, by working upon the short arm of the lever, so that more direct force is required on the part of the muscle than there is weight in the body moved. From this arrangement, however, the indispensable advantage is gained that the small contraction of the muscle causes an extensive movement of the part acted upon, and much greater rapidity of motion is secured. Each of the three orders of levers is met with in the different bones of the human skeleton; often, indeed, all three varieties are found in the same joint, as for example, the elbow, where the simple flexion and extension of the biceps and triceps muscles, which are large, fleshy masses on the front and back of the arm, between the shoulder and elbow, afford excellent illustrations, as shown in the accompanying figure.



Bones of the Forearm Acting As Levers of the Three Orders.

Illustration of Leverage.—The arm is used as a lever of the first order when the triceps is caused to contract, and by pulling upon the upper end of the forearm moves the hand around the elbow-joint, which serves as a fulcrum. This is shown in the upper diagram in which the hand is represented as striking a blow with a dagger.

Again the arm furnishes an example of a lever of the second order, when the hand resting on a point of support, such as a table, acts as the fulcrum, and the triceps muscle pulling on the upper end of the ulna or smaller arm bone, by straightening the arm lifts a weight placed upon it in front of the elbow.

The third order of levers is exemplified by the arm when bent by the contraction of the biceps in ordinary flexion of the elbow. Here the muscle, which is the power, is placed between the fulcrum, which is the lower end of the humerus at the elbow-joint, and the weight, which is lifted in the palm of the hand, as shown in the lower diagram.

Number of Muscles.—The whole number of muscles in the human being is not far from five hundred, mostly arranged in pairs on opposite

sides of the head, body or limbs. It is, therefore, manifestly impossible to describe them all in detail here, and yet there are a few which are important enough to require notice.

Important Muscles of the Face.—Among the muscles of the face should be mentioned those of the eye, six in number, four of which turn the eye-ball up or down, inward toward the nose or outward toward the temple, as becomes necessary to see an object distinctly. The muscles of expression are especially attached about the mouth, and produce their effects by puckering up the lips, as in whistling; drawing up the corners and widening the mouth, as in laughing; pulling down its angles, as in weeping, and so forth. The masseter muscles placed inside the cheeks between the upper and lower jaws are very strong, and enable human beings to chew up some very hard articles of food in the operation of mastication, as has been already explained.

Flexor Muscles.—The action of the large muscle of the front of the arm, called the biceps or two-headed muscle, has been already described. The muscle of the forearm, which shut the fingers as in clasping the hand, are called the flexors, because they flex or bend the fingers. The tendons by which their power is conveyed may be readily felt on the inside of the wrist of a man who tries to shut his hand when the fingers are forcibly held open by another person. The forearm muscles which open out the fingers after the hand is closed, in doubling up the first for instance by the flexors, are called the extensors. The tendons of the extensor muscles, when the latter are strongly contracted, show very distinctly on the back of the hand, as straight, hard cords, running from the root of each finger to the middle of the wrist.

Muscles of the Spinal Column.—The spinal column is almost surrounded, except in front, by a thick mass of muscles, which gives the great strength required by many kinds of laborers, such as porters who carry heavy loads upon their backs. The muscles of the leg, which are needed in walking, running and jumping, are very large and strong, corresponding to the hard work they are called upon to perform.

The Longest Muscle.—The longest muscle in the body is the sartorious or tailor's muscle, which is so named because it helps to bend the lower limbs into the cross-legged posture so frequently adopted by tailors. It lies on the inside of the thigh, is thin and narrow, but sometimes measures over two feet in length.

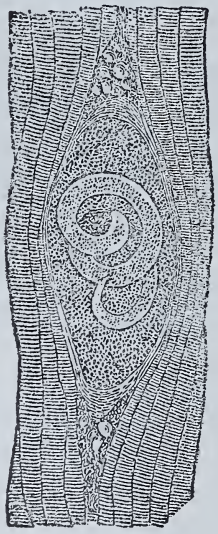
Intercostal Muscles.—The intercostals are flat, thin layers of muscular fibres, which extend from the lower edge of each rib, except the last pair,

to the upper margin of the rib next below. In this way they fill up all the spaces between the bars of the bony cage in which the lungs are contained, and, when they contract, pull up these bars or ribs so as to widen and deepen the cavity of the thorax, and so cause air to be drawn into the lungs.

DISEASES OF THE MUSCLES.

Inflammatory Disease.—Inflammatory disease of the muscular system, except as it is connected with rheumatism or pyemia, is extremely uncommon. When it occurs it is liable to go on to suppuration, and the formation of abscess. The pain is dull and aching rather than acute, and the disease is to be treated as already directed in speaking of the management of boils.

Hypertrophy and Atrophy.—These occur in muscles and produce effects important or otherwise, according to the position of the muscle in the animal economy. The most important hypertrophy is that of the muscle composing the heart, the influence of which has been detailed in the article on valvular disease affecting this organ.



Trichina Spiralis in Human Muscles.

Contractions.—Palsy and spasm in various forms have also been considered in the chapter on diseases of the nervous system, upon which these disturbances chiefly, thought not entirely, depend.

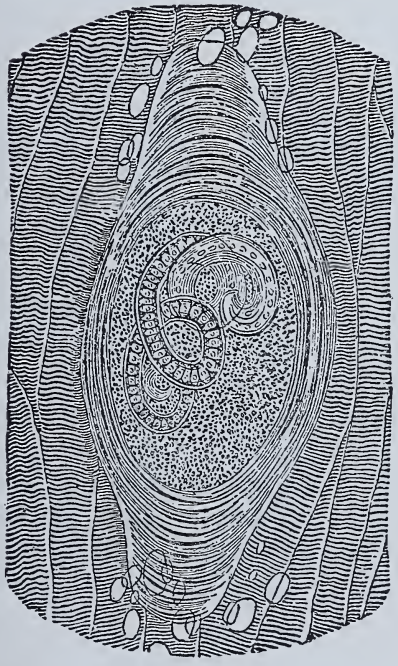
Trichiniasis.—The most important disease of the muscular system not yet discussed is its infection with parasites, and particularly with the trichina spiralis or pork worm, which, in consequence of the late embargoes upon American hams and bacon, has assumed a national or, indeed, an international importance. The great fatality in many cases of trichiniasis, as the malady produced by the trichina has been named, and the ease with which the whole trouble can be avoided by a proper understanding of the nature and origin of the affection, render a full account of the entire malady and its means of prevention singularly appropriate to a popular work like the present one.

The Trichina Spiralis.—The trichina spiralis, which is next, perhaps, to the echinococcus, the most dangerous animal parasite infecting man, is found also in pigs, foxes, guinea-pigs, rats, cats, mice, marmots, polecats, badgers, and more rarely in some other animals, including the dog. A

physician of Philadelphia found that of ten cats which he dissected in 1879 nine were infested with trichinæ.

Sources of Trichinæ.—Pigs, from which the human race is most apt to become diseased with trichina, are supposed to become themselves infected, chiefly from eating rats, the offal of other pigs, and the excreta of human beings containing trichinæ. It is doubtful whether a single case of trichiniasis in man ever occurred where the patients became infected otherwise than by eating raw or underdone pork, and the most common sources of infection are sausages, ham and bacon.

How Trichinæ Breed.—If the trichinæ existing in diseased pork are very young they may be simply digested, when they reach the human stomach, without being developed. But if the parasites have attained their fuller growth, the cysts which contain them are alone dissolved by the gastric juice, and the embyro is set free. These embryos, after they pass through the pylorus and duodenum, soon become mature, and their thread-like appearance renders them quite easily recognizable by the naked eye. Countless eggs are now discharged by the females, and in about a week's time the new brood of trichinæ hatched out from these eggs begin to make their way to the muscles, either by boring their way through the soft tissues, or by being carried along by the current of blood in the blood-vessels, or perhaps by both of these methods of progression through the body. These larval trichinæ attain their full size in about two weeks from the time they leave the egg. The males and females are each about one-thirtieth of an inch long and about one seven-hundredth of an inch broad.



Encysted Trichina More Highly Magnified Showing Structure of the Parasites.

Effects of Trichinæ.—In some few favorable cases severe gastro-intestinal inflammation is set up, and the parasites are violently expelled by diarrhœa, without being able to enter the muscles at all, so that if it

were possible to detect the malady with certainty at this stage, nature thus suggests the appropriate treatment by drastic purgatives. In the majority of instances, however, the migration of immense numbers of larval trichinæ from the intestinal canal takes place, and occupies in general about four days only. In this brief space of time even the most distant muscles of the body may all be invaded.

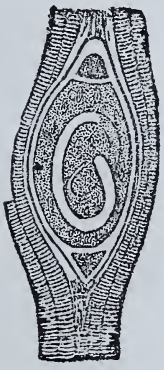
Symptoms.—Among the earlier symptoms of the trichina disease are a general feeling of debility and discomfort, and a loss of appetite, to which succeed nausea and vomiting, diarrhœa, prostration of strength, and a sensation of stiffness about the neck, arms and legs. These evidences of illness resemble, it will be observed, to a great extent, the first stage of typhoid fever, for which the cases are usually mistaken if there is no point in the history of the patient to suggest trichiniasis. The further progress of the parasites through the tissues sets up high fever, with frequent pulse and copious offensive perspirations, although the temperature of the body seldom or never reaches the elevation which characterizes that of typhoid. For some days the stiffness of the limbs seems to increase, while all the muscles become painful, swollen, and very sensitive to the touch.

A Characteristic Sign.—About the end of the first week the attention of the attending physician is usually awakened (if it has not previously been aroused) to a suspicion of the trichina disease by the appearance of an edematous swelling of the eyelids and root of the nose. This is often the first characteristic sign of trichiniasis, and should be looked for at this period of the illness in all cases of supposed typhoid and rheumatic fever. During the second week movement of the intercostal muscles in respiration grows very painful, thus preventing to a great extent the necessary repose of the patient. If the diaphragm is invaded, severe hiccough is apt to come on, and when the larval trichinæ commence to infest the laryngeal muscles hoarseness and loss of voice make their appearance.

Cause Paralysis and Exhaustion.—When a large quantity of trichinous meat has been eaten, so that the immigration into the muscles of the afflicted patient is by millions, they soon cause an almost paralyzed condition, attended by excessive exhaustion. The facial edema continues through the second week, when it generally disappears, and is followed by swelling of the feet and legs, and ultimately of the trunk. At the end of the third week, if the patient survives to this period, the pulse and respiration are very frequent, the tongue is red and dry; the mouth can scarcely be opened, the sweating is profuse, the pain so severe that little or no sleep can be obtained, and there is great anxiety or delirium, death frequently

occurring in the fourth or fifth week, with symptoms of profound exhaustion.

Complications.—Complications, such as pneumonia, peritonitis and pleurisy, are not uncommon, but in favorable cases when the number of trichinæ is comparatively small, or the constitution of the patient unusually vigorous, the pain, swelling and diarrhœa begin to abate, the oppression of breathing passes off, the desire for food returns, sleep is obtained, and the anemic patient enters upon a slow and tedious convalescence; the parasites having become encysted within the muscles, these gradually become acclimated, as it were, to the presence of the foreign bodies, and slowly regain most or all of their original powers and functions.



Commencing Calcification of Trichina Cyst.

Further Symptoms.—After piercing the fibrous sheath of the muscular fibre bundles, the embryonic trichinæ become encysted within lemon-shaped capsules (generally one worm in each capsule), of a sort of connective tissue, in which they have some freedom of movement. After a time, these capsules, which, of course, are fixed to one spot in the muscle, become calcified, a process which occupies in man about two years. During this period there is often, for a time, in patients who recover, some loss of power, for a while almost complete, in muscles or groups of muscles; but not infrequently, after this stage is reached, entire recovery ultimately seems to take place. Still, this infested condition of the muscle, which probably exists in thousands of people who walk about utterly unconscious of it, may be the yet undetermined cause of rheumatism and paralysis, or promote the development of consumption and other wasting diseases.

Size of Mature Trichinæ Spiralis.—The mature trichinæ—the males being about one-eighteenth and the females about one-eighth of an inch long—live in the intestines for six or eight weeks. They never reach the soft tissues of the body, in which their young larvæ are so abundant, but are discharged, from time to time, with the excreta of the patient, either alive or after their death has occurred.

Discovery of Trichinæ.—Trichinæ, as well as cysticerci, were first discovered in human beings in the dissecting room, by Dr. Simon, in 1835. Professor Leidy was the first to detect them in the pig. They were, however, repeatedly observed without their true import being ascertained until 1860, when Dr. Zenker, of Dresden, explained their origin and

relation to certain symptoms of obscure attacks of sickness, and described the disease trichinosis or trichiniasis. In the same year Leukart published his elaborate and trustworthy investigations upon the subject of the trichina. Previous to 1860 the trichina had been identified only once in pork, although, as occurring in man, it had been well known for a quarter of a century. It is not decided how it will retain its vitality when encysted in human muscles.

Remarkable Vitality of the Trichinæ.—Professor Langenbeck, of Berlin, has reported a case where, in removing a tumor from the neck of a patient, eighteen years after the man had an attach of trichiniasis, which passed for poisoning at the time, he found living trichinæ in the fragments of attached muscles; and it is stated on good authority that they have been known to exhibit signs of life after a still greater lapse of time. As in this instance, before Zenker's discovery, very many cases passed for poisoning, for typhoid and rheumatic fever, and for other diseases. An epidemic involving over five hundred persons in Blankenberg, Germany, was treated as an outbreak of gastro-rheumatic fever, and it was only several years afterward that the attention of one of the gentlemen who suffered from the disease being called to Zenker's discovery, he submitted to an operation for the removal of a small piece of one of his pectoral muscles, in which encysted trichinæ were detected, and the true nature of the disorder which had affected the five hundred patients many years previously was revealed for the first time.

Trichina and Its Cyst Completely Calcified.

Epidemics of Trichiniasis.—In this country severe epidemics have occurred in New York, Mississippi and Iowa, and isolated cases are from time to time appearing in various other States. In 1875, it is stated, that there were some eighty cases of trichiniasis in Berlin, and about seventy-five near Hanover. A group of cases occurred in 1882 in Bridesburg, and another near New York. In 1874 there was quite a severe epidemic in the family of a pork packer residing in Buffalo, New York. The disease is as rare in France as it is common throughout the German Empire.

Vitalty of Trichinæ After Death of Infected Hog.—In pork the trichinæ may be found either encysted or naked among the muscular fibres. It is not certain how long they may live after the pig is killed, but they are known to be capable of propagation after remaining for

one hundred days in putrid pork. The frequency of the disease in swine is probably as great, if not greater, in America than elsewhere; but here mankind is not so often infected, because less raw or under-done sausage, ham, bacon, and so forth, is eaten with us than in Europe. Of 1,394 hogs taken at random, and examined by the Chicago Academy of Sciences, twenty-eight were found to be infected with trichinæ; but this large proportion can only be accounted for on the supposition that an epidemic among swine was then raging.

Method of Detecting Trichinæ.—The editor of the *American Journal of Microscopy* recommends that in examining the flesh of swine suspected of being infected with trichinæ, the following method should be adopted: The parts of the animal to be first tested are the diaphragm, the tenderloin, and the muscles of the head and throat. In the ham, the most likely place to find the parasites is where the muscle ends in tendon. A thin slice should be cut off with a sharp scalpel, or with a pair of scissors curved on the flat. This thin section should then be soaked for some minutes in acetic acid, spread out on a glass slide, and covered with a thin glass in the ordinary way; or, if the section happens to be very thick, a compressorium, in which the two plates of glass are forced together by means of a lever and screw, will be found very useful.

Human Muscle Containing Calcified Trichinæ. (Natural Size.)

A little instrument constructed on the plan of the compressorium, and called a "trichinoscope," is sold to supply the popular demand for home protection against trichinæ.

Infected Pork Should be Destroyed.—All pork which has been found to contain trichinæ should be seized, condemned and destroyed, either by fire or by strong mineral acids, such as the sulphuric or nitric. Mere burying of poisonous meat of this kind is obviously not sufficient. Moreover, the question as to whether owners of such carcasses should not be compensated for all property confiscated, is well worthy of consideration; because if such was the rule, butchers and dealers would have no inducement for concealment and fraudulent sale.

Only Safe Rule.—In spite, however, of any apparently perfect system of inspection, such as that adopted in Germany, dangerous meat, from some cause or other, will necessarily escape observation, so that the only

THE MUSCULAR SYSTEM (See Adjoining Plate).

The plate presents a comprehensive view of the front muscles of the body. They may be grouped and viewed thus:

Head Muscles.—1. These are seen above the eyes, and are used for elevating the upper eyelids and corrugating the forehead.

Face Muscles.—2. These are muscles of expression and mastication. Those about the eyes are used in winking and opening and shutting. Those seen at either side of the nose lift the cheeks and lips. Those at the sides control the lower jaw in eating.

Neck Muscles.—3. These serve to lower and raise the head and turn it from side to side.

Shoulder Muscles.—4. These embrace the shoulders and upper arm. They are the great lifting and hitting muscles. The prominent one on the upper arm is the biceps muscle, or muscle with two heads.

Muscles of Forearm.—5. These control rotary, flexor and extensor motion, from the elbow to the wrist.

Hand Muscles.—6. These control all hand motions—opening and shutting, rotation, flexor and extensor movements.

Chest Muscles.—7. These are radiating from sides to centre. They control the twisting, elevation and lowering of the upper part of the body.

Abdominal Muscle.—8. This is seen in the centre, in white. It is intimately connected with breathing and raising and lowering the diaphragm. At its top is the *solar plexus,* the spot upon which prizefighters seek to deliver their knockout blows.

Hip, Thigh and Leg Muscles.—9. These powerful muscles coöperate for every kind of movement and exhibition of strength. The two strap-like muscles of the upper leg are the sartorial, or tailor's muscles, which enable us to cross our legs.

Lower Leg Muscles.—10. These are also powerful, and possessed of rotary, flexor and extensor power. They largely control the feet in walking, operating clear to the ankle joint.

Foot Muscle.—11. These control from instep to toes, each toe having its elevating and depressing muscle. The rotary motion of the foot is imparted wholly from the ankle.

The Muscular System Front view.

safe rule for us to adopt, and to urge upon everybody else, is never to eat any pork which has not been thoroughly cooked.

It is not safe to trust to pickling and smoking, even when these processes are combined, as is ordinarily the case, and it must be borne in mind that meat is seldom thoroughly cooked when cut in slices more than an inch thick.

The fact that two dangerous and often fatal maladies like trichiniasis and cysticercus disease, both of which are generally beyond the reach of medical treatment when once they have infected the human system, are not infrequent from eating pork which has been imperfectly cooked, should render the employment of this culinary precaution in regard to all meats universal, especially as it is a safeguard so easily applied.

Myositis.—This affection consists in an inflammation of the voluntary muscles, and may arise from injury to or overuse of a muscle, from gout or rheumatism, from secondary syphilis, or from infection followed by suppuration.

Treatment.—The treatment for injury or overuse of muscle is absolute rest of muscle and the local application of anodyne lotions.

If due to rheumatism or syphilis, prompt relief will follow treatment appropriate to these affections.

Degeneraton of Muscles.—Fatty degeneration is occasionally observed in muscular tissue—in which the tissue is converted into a fatty granular mass.

Treatment.—By use of passive motion, massage and electricity to improve nutrition of the muscles.

Ossification.—Ossification of a portion of a muscle, or more frequently of its point of insertion into a bone, is occasionally observed as a result of long-continued irritation. Its course is slow and unaffected by treatment.

Tumors.—Muscles may be the seat of cancerous, syphilitic, vascular, cartilaginous or osseous growths. The treatment depends entirely upon their nature; non-malignant growths can often be removed by dissection; cancerous or malignant growths involving muscles of the extremities should be cut out or, as many cases call for, prompt amputation of the limb.

PART XIII OF BOOK IV

Tells of the diseases to which children are particularly susceptible, giving the newest and most reliable treatments.

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CURATIVE MEDICINE

PART XIII.

DISEASES OF CHILDREN

Proneness of Children to Certain Diseases.—While the diseases incident to those between three and fifteen years of age, which constitutes the period of childhood, are not confined exclusively to this time of life, and while they are few, if any, which may not occur also among infants or adults, children are particularly prone to the development of certain ailments which are rarely seen among those either older or younger. Many of the acute infectious diseases, such as scarlet fever, measles and chicken-pox belong more especially to this period, first, because children seem particularly susceptible to them; and, second, because, as they reach an age when they begin to mingle with others, they become liable to exposure to contagion, and having once had them they become, as a rule, immune, or free from liability to their recurrence, from the well-known fact that most of these diseases generally occur only once in a lifetime.

As these constitute a large proportion of what are ordinarily known as children's diseases, it will be appropriate to consider them first.

ACUTE INFECTIOUS DISEASES

MEASLES.

General Description.—This disease, known also as morbilli and rubeola, is highly contagious, being conveyed not only by the touch and breath of the one affected, but also by infected articles and by a third person. Of all the contagious diseases it is the most liable to recur, there being sometimes, though not often, several attacks in the same person.

Characteristics.—It is characterized by fever, catarrhal symptoms and an eruption. Unless complicated by more serious ailments, such as

bronchitis, which is the most frequent, it is rarely fatal if malignant forms such as hemorrhagic and black measles be excepted. From ten to twenty days elapse after exposure to contagion before the symptoms develop.

Symptoms.—The ordinary symptoms of a cold in the head, with feverishness and often headache and nausea are usually first noticed, being accompanied or soon followed by cough. These persist with increasing fever until, usually on the fourth day, an eruption appears, beginning on the forehead, neck and face, and during the next twenty-four hours gradually extending over the entire surface of the body. It consists first of distinct, slightly raised red spots resembling flea-bites, which disappear momentarily on pressure; they gradually increase in size and sometimes join each other, becoming confluent and making continuous patches of dusky redness, between which healthy skin may be seen.

An entire day before the eruption appears, examination of the inner surface of the cheeks will reveal the presence of bluish-white spots.

Length of Eruption.—The eruption remains at its height only about a day, when it begins to fade, and in two or three days it has entirely disappeared. To a less extent than in scarlet fever, desquamation of a fine branny character follows, more especially when the eruption has been intense.

Temperature.—The temperature, which during the first few days continues to rise, gradually declines when the eruption appears.

Swollen Glands.—At the height of the disease the glands of the neck and the features are swollen, and the eyes are sensitive to light and affected with a profuse watery discharge which may become thicker.

Diagnosis.—Measles may be mistaken for scarlet fever and for German measles. Its rash, however, is more blotchy and less uniform than that of the other diseases and does not appear as early as does that of scarlet fever. The catarrhal symptoms are more pronounced, while in scarlet fever sore throat is a prominent feature.

Treatment.—1. For the fever, from five to ten drops of sweet spirits of nitre in a teaspoonful of solution of acetate of ammonium, or simply in sweetened water, every two or three hours, will not only reduce the temperature but act on the skin and kidneys.

2. If a laxative is needed give a half wineglassful of citrate of magnesia every half hour until the desired effect is produced. Or give one-twelfth of a grain of calomel every hour. This will be helpful also in

settling the stomach if it is irritable, especially if combined with two grains of bicarbonate of soda.

3. For diarrhœa, which sometimes occurs, give a teaspoonful of chalk mixture every two or three hours, with five or ten drops of paregoric and two or three grains of subnitrate of bismuth.

4. For the inflamed eyes, bathe them with tepid water and drop into them every hour or two a few drops of a solution of twenty grains each of borax and boric acid and an ounce each of rose water and camphor water. The surface of the eyeball may be thoroughly cleansed with this solution, by gently separating the lids with the thumb and forefinger of the left hand and carefully expressing a medicine dropper full of the liquid into the corner of the eye. Before using it the liquid should invariably be made lukewarm by immersing the bottle containing it in a vessel of warm water for a few minutes.

5. The cough will be relieved by freely drinking flaxseed tea, with a little sugar and lemon juice, or by a half teaspoonful of brown mixture given every two hours. Camphorated oil may be applied to the chest every few hours, and a thin sheet of cotton wrapped around the chest to protect from liability to cold. If persistent, the cough may be benefited by the following, given in doses of a teaspoonful every two or three hours to a child from five to ten years old:

Carbonate of ammonium	16 grains
Chloride of ammonium	24 grains
Syrup of wild cherry enough to make	3 ounces

Or one-half teaspoonful of elix terpen hydrate and heroin every 2 or 3 hours.

6. During convalescence it is advisable to give some such reconstructive and tonic as syrup or solution of hypophosphites, a teaspoonful three times daily, or a like amount of a good extract of malt, with or without cod-liver oil. This will aid in the prevention of serious constitutional and pulmonary ailments which sometimes occur as sequels of this disease.

Nursing.—The patient should be kept in bed and protected from exposure to cold, as the chief danger is from liability to bronchitis and pneumonia. Bathing the body with lukewarm water every few hours. uncovering only a small portion of the surface at a time, will add to comfort and aid in reducing fever. The room should be kept darkened on account of the condition of the eyes. When the eruption appears to be

delayed or does not come out well, warm baths and hot drinks should be employed.

Diet.—Plain, simple, nutritious diet, such as is suited to all fever cases should be given. Milk and broths will be found useful as a foundation for other articles of food.

General Remarks.—Any case of measles should be treated as a serious disease, and is epecially dangerous to children under five years of age and those constitutionally weak. It kills usually by causing pneumonia, abscess of the lungs, or in the ear, and very frequently causes consumption. It injures the eyes, which is due to their covering membrane being inflamed. Deafness is a frequent result, following abscess of the ear, which is noticed by the attendant as a yellowish discharge of pus (matter) running from one or both ears. This abscess may cause inflammation of the membranes of the brain (meningitis) by breaking through the base of the brain, and may be fatal.

It is a mistaken idea and a wrong one to purposely expose a child to measles because "they might as well contract it while young."

Measles is one of the most contagious diseases of childhood. Ninety-eight per cent. out of every one hundred children who have not had measles will take it by coming in contact with another case. It is "catching" four days before the "rash" or breaking out in the skin occurs, and remains so until the falling off of the bran-like skin flakes is completed, a total period of twenty-one days.

The early symptoms of measles begin as an ordinary cold. The child coughs, sneezes, has a running nose, the eyes are red and injected, there is a slight fever, loss of appetite and general restlessness at night. Children attending school with these symptoms should be sent home, and if a general epidemic breaks out, it is better to close and disinfect the school.

Every case of measles must be reported promptly to the Board of Health by the physician or guardian of the child. The neglect of parents to summon a physician on account of the expense or fear of quarantine and ignorance chiefly in regard to the dangers of measles, are main factors in causing the spread of epidemics. Children treated at home do get well without a physician, but the danger lies in the child being allowed to get up and go to school or play with other children before the time of "catching" is over. Because your child has recovered rapidly is no reason why your neighbor's child should be exposed and possibly have a severe illness followed by pneumonia, abscess of the ear, deafness, etc., and death in many cases.

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MEASLES (Rubeola).
Fifth and Sixth Days.

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SCARLET FEVER.
Period of Decline.

SCARLET FEVER (Scarlatina).
Third and Fourth Days.

All sufferers from measles should be removed to a room which can best be shut off from the rest of the house; carpets, curtains, necessary furniture and clothing should be removed. Kill all flies in the room and screen the windows and doors if necessary to keep others out. Lower the curtains to protect the patient's eyes from direct, bright light. Keep patient in bed continuously until all fever, cough and rash have disappeared. Allow windows of room to remain open, but do not expose patient to draught. Fresh air will not hurt if child is warmly clad. Members of the family who have not had the measles should stay in the house. This is necessary, for they are liable to catch it at any time and give it to others before the rash appears. Adults who have had measles can go about their occupations, but must not go near the patient or attend churches, theatres or other public gatherings. School teachers should not attend school if measles is in their home. Children who have had measles may go to the homes of relatives if there are no children, and their person and clothing have been disinfected. They cannot attend school, however, until fourteen days have elapsed and must not return or visit home until the room where the patient has been ill in, has been disinfected and the quarantine lifted.

Dishes, etc., used by the patient must be dipped in a solution of chloride of lime before being taken to the kitchen. One-half pound of lime to a pail of water is strong enough for disinfection. Napkins, towels, bed linen, etc., must be dipped in the above solution before being removed from the room. Remember it is cheaper and easier to follow the above precautions than to have another case in your own house, and is necessary to prevent your neighbors from contracting the disease.

GERMAN MEASLES.

General Description.—German or French measles, known also as rötheln and rubella, is a contagious disease, usually mild in character, having as its main features fever and eruption. It resembles in some respects genuine measles. After exposure to contagion, from ten to twelve days elapse before the symptoms develop.

Symptoms.—Frequently the first symptom, and always early in the course of the diseases, is the appearance of an eruption on the face, which during the first day spreads to the body and extremities. It consists of reddish spots, rather brighter than those of measles, which like those in that disease are somewhat raised and disappear on pressure. In the course

of two or three days it fades away and is followed by slight branny desquamation. Accompanying this are slight fever and mild catarrhal symptoms, with quite frequently swelling of the glands of the neck.

Diagnosis.—The diagnostic points to be observed are sufficiently noted in the section on measles to which the reader is referred.

Treatment.—Rarely is more treatment needed than the spirits of nitre, recommended for the fever of measles, and for the itching of the skin, which is sometimes an annoying symptom, the surface may be dusted with compound stearate of zinc with menthol.

Nursing and Diet of a special character is not needed.

SCARLET FEVER.

General Description.—Scarlet fever is one of the most serious of the acute infectious diseases of childhood, and is characterized by fever, eruption and sore throat. It is known also as scarlatina, a term often erroneously understood to mean a mild form of the disease. Though distinctly contagious it is not so markedly so as measles, but infected articles of clothing, and so forth, retain the power to convey the disease for long periods of time. One attack generally protects from another, although exceptions to this rule occur. From three to twelve days, and sometimes more, elapse after exposure to contagion before the disease develops.

Symptoms.—These are usually sudden in their onset. The child previously apparently well or merely languid is without assignable cause seized with vomiting or has a chill. High fever, with the temperature ranging from 103 degrees to 105 degrees, rapidly supervenes, the face is flushed, the throat is inflamed and dry, the head aches and the tongue is somewhat coated, with red points projecting above the surrounding surface, somewhat resembling a strawberry in appearance.

Usually on the following day a scarlet eruption appears, first on the chest, and extending rapidly over the body, being most marked in the flexures of the joints and where the surface of the skin is particularly subjected to pressure or heat. This redness may be quite uniform or may occur in patches, with intervening areas of healthy skin. On drawing the fingers quickly over the surface a white line appears, which is, however, replaced almost at once by the original efflorescence. On this red base are to be seen many distinct, bright, minute red points, and occasionally larger red spots. The inflamed surface occasions itching of varying intensity and

swelling of the skin. In the course of two or three days the eruption gradually fades, and with this the temperature declines. The outer layer of the skin now gradually peels off in flakes of variable size, the palms of the hands and the soles of the feet usually being the last to undergo this process. Until this has entirely ceased, and it may be prolonged to six or eight weeks, the danger of conveying the disease persists, inasmuch as the source of contagion lies largely, though not exclusively, in these particles of skin.

Prominent Features of the Disease.—Among the most pronounced features of the disease are the swollen glands of the neck and the inflamed condition of the throat, which may be so marked as to produce patches resembling those seen in diphtheria. These consist of a membranous exudate which sometimes extends from the throat into the adjacent passages, causing serious complications. Among these is inflammation of the middle ear, with perforation of the ear drum, one of the most frequent causes of deafness. Frequently the kidneys become involved, acute inflammation of greater or less intensity occurring. Recovery from this, however, is usual.

Convulsions.—Convulsions may be present either from the kidney complications or from profound impression on the nervous system by the poison of the disease. In the latter cases the disease assumes a malignant type, with excessive temperature, delirium, stupor and often diarrhœa and vomiting, as symptoms which rapidly lead to a fatal issue, sometimes within a few hours. On the other hand, cases occur which are so mild as to be scarcely recognizable as genuine scarlet fever, except from observation of a sequel and inquiry as to preceding circumstances. A physician, for instance, may be consulted for edema or dropsy of the extremities, indicating the existence of kidney affection, and on investigation may ascertain that a few weeks before the child had had a slight rash, followed by desquamation, without complaining sufficient to be kept in bed, and that there is a history of its having been exposed to the contagion. Such a record would justify the diagnosis of scarlet fever.

Irregular Manifestations.—Besides these variations from the usual type of the disease there are irregular manifestations, such as the hemorrhagic form, and grave complications such as gangrene and heart disease, which cannot, however, within the limits of this article, receive more than passing mention.

Diagnosis.—1. Acute exfoliative dermatitis is a disease of the skin in which marked desquamation occurs, resembling in this particular scarlet

fever. The throat symptoms, however, so significant of the latter disease, rarely occur, nor is the characteristic appearance of the tongue present.

2. **Measles.**—The throat symptoms instead of the catarrhal manifestations; the sudden onset instead of the gradual development; the character of the eruption and the fact that it appears much earlier in scarlet fever, and the difference in the temperature record usually suffice to enable a diagnosis without much difficulty.

3. **German Measles.**—This has already been discussed in connection with that disease.

4. **Diphtheria.**—From this disease it differs, in that the false membrane in the throat does not appear for a number of days after the beginning of the illness, whereas in diphtheria it is seen at once. The early appearance and the characteristics of the eruption are also diagnostic points of value.

Nursing.—A warm bath at the outset of the disease will promote the activity of the skin and aid in bringing out the eruption. Frequent sponging with lukewarm water throughout the attack is of advantage. When desquamation begins the surface of the body should daily be anointed with carbolized vaseline or other ointment oil to facilitate the process of scaling and to aid in preventing the small particles from becoming scattered. Particular care should be exercised to gather all these and burn them. In order that all may be obtained a large sheet should be spread on the floor beneath the bed. The utmost caution should be observed to prevent the patient from taking cold, both during the attack and after convalescence is established, and for fully a week after the temperature is normal he should still be kept in bed.

Diet.—Milk, broths and water may be freely given, and if the fever is high ice bags may be advantageously applied to the head.

Treatment.—1. For the throat symptoms, a spray of peroxide of hydrogen and water, equal parts, should be used; or a saturated solution of chlorate of potash may be employed as a gargle. Cold applications to the neck are also useful.

2. In severe cases stimulants may be required for the weak condition of the heart. Half teaspoonful doses of whiskey, or ten-drop doses of aromatic spirits of ammonia in water should in these cases be given every two hours. Drop doses of tincture of digitalis every three hours are also useful.

3. In case the inflammation extends from the throat and involves,

as it often does, the ear, the aid of a specialist in ear troubles will probably be required to save the patient from impairment of hearing.

4. In inflammation of the kidneys, five grains of acetate or citrate of potash and a teaspoonful of infusion of digitalis every three hours will be proper for a child five years of age.

5. The following is useful for the reduction of fever:

Tincture of aconite	20 minims
Solution of citrate of potash	3 ounces

Give a teaspoonful in a little sweetened water every hour until the fever is reduced and the skin becomes moist.

Another prescription is: Tincture of aconite root, 25 drops; salicylic acid, 1 drachm; syrup, 2 ounces. Teaspoonful every two or three hours. Or, tincture of iron in five to ten drop doses every four hours.

The external use of fat, raw bacon is recommended in connection with which use a gargle composed of one teaspoonful of cayenne pepper, two teaspoonfuls of salt and half a pint of boiling water, to which, after straining, is added a pint of vinegar. Gargle the throat frequently with this mixture and adults may take one teaspoonful internally every hour, and children in proportionately smaller doses, according to age.

General Remarks.—Scarlet fever is one of the most contagious diseases that attacks children and those of a run down constitution. It is contagious in its mildest form and very often these mild cases are the ones which spread an epidemic, as they are overlooked by the guardians of the children and physicians unless very carefully examined, owing to the absence of the rash, the child simply complaining of sore throat, tiredness and loss of appetite. The severest cases can develop by coming in contact with the mildest ones.

Scarlet fever is one of the most dangerous diseases of childhood, owing to its after-effects. The common after-effects are inflammation of the kidneys (acute nephritis), heart disease, abscess of the ear, the glands of the neck, and joint affections. Deafness may follow an abscess of the ear. If the abscess breaks through the floor of the skull, inflammation of the coverings of brain occurs (Meningitis).

A case of scarlet fever may develop in one to seven days after a child or adult has come in contact with a case.

A person catches scarlet fever by taking in the germs that have been shed or discharged from the nose and throat of the patient having the

disease. The germs are usually inhaled or taken in through a sore or cut surface on any part of the body.

The early symptoms of scarlet fever consist of vomiting and fever, and older children and adults complain of sore throat. A normal case shows a rash which appears in from twelve to forty-eight hours. It is seen first on the neck and upper part of the chest as fine, bright red, pin-point spots, which spread to the face, arms, legs and body of a well-marked case. The child is fiery red in appearance (the so-called lobster appearance). High fever occurs, and a discharge from the nose is seen. The throat is red, the tonsils show whitish or dirty yellow spots; the tongue is coated and red spots present themselves through the gray coat (Raspberry Tongue).

Every case of sore throat in a child should be considered serious, and a physician summoned at once to say whether it is scarlet fever or diphtheria. Do not allow a child with a sore throat to play with other children, attend school, Sunday-school included, until the diagnosis is settled. The spread of scarlet fever can be prevented by placing the patient in a room for a period of from five to eight weeks, depending upon the time of peeling, when the large pieces of skin are thrown off, and all discharges from the nose, ear, etc., end.

All cases must be reported to the Board of Health by the physician or guardian in attendance. The custom of placing a sign on the front and back doors of a house where the patient is confined must be permitted; it acts as a warning to others and must not be removed until done so by the health authorities. If the patient is not sent to a contagious hospital, he or she must be placed in a room away from the rest of the family. Wherever possible a trained nurse or attendant should be placed in the room and should not leave it until the quarantine is lifted. No one should be permitted to visit the room but the physician, who should be furnished with a gown to wear upon entering and taken off when leaving. The room must be screened and all living flies and insects destroyed. Carpets, curtains, clothing, hangings removed wherever possible. A sheet dipped in a solution of chloride of lime (one-half pound of chloride of lime to a pail of cold water) must be hung over the doors of the room. As the germs of the disease settle everywhere in the form of fine dust, the nurse should wipe off all surfaces in the room and the door-knob with a cloth moistened in the chloride of lime solution. The hair of the nurse or attendant should be completely covered by a covering of washable material and the outer garment by a long gown or slip. If it is absolutely necessary for

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CHICKEN-POX.
Second and Third Day.

the nurse or attendant to leave the sick room, she must leave her shoes and coverings in the room. Outside the room she must wash her hands in the chloride of lime solution.

Dishes, napkins, bed linen should not be removed or washed until dipped in the chloride of lime solution, kept at the sick room door. Bowel movements or urine carried from the sick room should be wrapped in a towel wet in chloride of lime solution.

The health authorities demand that no teacher or scholar living in the house at the time of the outbreak or during the course of the disease, shall attend school of any kind until permitted to do so by them.

Milk jars cannot be returned to the milkman until they have been disinfected under the supervision of the Board of Health. The Board of Health will not disinfect or fumigate until the case is through peeling, all discharges have stopped and the patient recovered. Peeling may not occur from five to eight weeks. The danger of contagion during this period can be lessened by greasing the surface of the skin with lard or cocoa butter, which prevents the scales from blowing around the room. The nurse can hurry the peeling by gently peeling the large flakes of skin off when loose and collect them in a vessel to be treated with chloride of lime solution.

When the room is ready for disinfection, do not take out the clothing of nurse, patient, or gown worn by the doctor, bed linen, etc. Spread them out in order to allow the disinfectant to readily reach them.

In case of death, the funeral is usually ordered held within thirty-six hours and must be private.

CHICKEN-POX.

General Consideration.—Chicken-pox or varicella is a contagious disease having an eruption of vesicles. It generally occurs in children under six years of age, though it is sometimes seen in adults. One attack confers immunity from a recurrence in the same individual. From ten to seventeen days elapse after exposure to the contagion before the symptoms develop.

Symptoms.—Often the appearance of the eruption is the most marked symptom, although there is also slight fever which may be accompanied by chills, vomiting, headache and pain in the back and legs. The eruption

comes out during the first day, usually appearing first on the chest or back, though sometimes on the forehead in the form of red spots. Later they are seen also on the extremities. They vary in number from one or two dozen to several hundred.

In the course of a few hours the papular spots become vesicular, filled with a turbid liquid, and these by the end of a day or so begin to dry. Fresh crops during the few days following continue to appear, so that by the third or fourth day they may be seen in all stages of development. Itching is often quite marked, and scars are apt to result if the patient is not prevented from scratching.

Diagnosis.—Failure to distinguish this disease from mild cases of small-pox has not unfrequently occurred. In the latter disease, however, the eruption does not appear until the third or fourth day of the disease, and it is first seen on the face and forehead. The vesicles are not present until the fifth or sixth day; they become depressed in the centre and by the eighth day become pustular, not beginning to dry until after this time. The eruption is not seen in different stages of development as in chicken-pox. It is quite frequent in small-pox also to observe in the beginning of the attacks rashes resembling those of scarlet fever and measles.

Nursing and Treatment.—A mild laxative and a simple fever remedy are all that are required. Five drops of sweet spirits of nitre in a little water every hour, if the fever is marked, will be sufficient. Most cases require no treatment except isolation.

The following contagious diseases differ from those already considered, in the fact that they occur without eruption, namely, diphtheria, whooping-cough and mumps.

DIPHTHERIA.

General Consideration.—This is a highly contagious constitutional disease, having a local manifestation in the form of a false membrane, which occurs either on the skin, or, more often, on the mucous membrane. Its usual locations are the throat, nose and larynx. The disease may be very mild or it may be extremely fatal. Different epidemics exhibit different degrees of virulence, and the cases occurring early in a given epidemic are usually the most severe. It is communicated by inoculation, by contact with the person affected, by means of the saliva, the pharyngeal secretions and portions of membrane; by exposure to the poison of the disease through the agency of infected clothing, bedding, apartments, and so forth, and through foul emanations. Defective sanitary conditions favor its de-

velopment. Its occurrence is associated with the presence of a certain special germ which is supposed to be the cause of the disease. In some cases, however, the germ cannot be found; in others it is seen only early or only late in the disease; while again the germ may be found in the throats of those who present no constitutional or local symptoms of the affection. One attack does not confer immunity from another attack, and the symptoms develop from two to twelve days after exposure to the contagion.

Symptoms.—The initial symptoms are those ordinarily attending a slight cold, such as a feeling of fullness and irritation of the throat, accompanied by moderate fever, chilliness and general lassitude. Although it may be delayed for a day or two, usually within a few hours, examination of the throat reveals on the tonsils the presence of a small whitish-gray patch or patches of fibrinous exudate or false membrane, which spread with greater or less rapidity, often involving the pharynx and nose, and extending downward to the larynx, and so forth. The color soon becomes dirty gray or yellowish. If the membrane is removed new membrane rapidly forms in its place. With the progress of the case, if it is severe, the constitutional symptoms become more marked; the glands of the neck swell; delirium and stupor may occur; the heart becomes weak and there is every indication of profound blood poisoning. This may indeed be manifested quite early in the course of the disease. With these grave symptoms it is not infrequent for the temperature to be but slightly raised or even subnormal. The presence of a thick membrane is not necessarily indicative of the existence of a grave case, for severe symptoms are quite as apt to occur when the membrane is thin. There may be considerable destruction of tissue from the sloughing membrane, giving rise to intense fetor.

When the membrane involves the larynx an additional element of danger confronts the patient in the mechanical obstruction of the air passages. The breathing is harsh and rasping, the voice often suppressed to a whisper, a brazen, croupy cough develops, pallor of the countenance and lividity of the lips may supervene, the patient struggles for air and unless speedily relieved death from suffocation occurs.

In the milder cases of tonsillar and pharyngeal diphtheria, after persisting for a few days, the membrane gradually disappears, coincident with which there is decided amelioration in the symptoms. Even in mild cases, paralysis of the muscles of the throat is quite apt to occur, causing diffi-

culty in swallowing liquids, which often regurgitate through the nose. Renal complications sometimes occur.

Diagnosis.—In mild cases of diphtheria affecting the tonsils alone, it is difficult and sometimes impossible to distinguish them from cases of tonsillitis with exudation. As a rule, however, the thickness and gray color of the membrane, its tendency to spread, the glandular involvement and the general severity of the symptoms in diphtheria simplify the matter of diagnosis. The presence of the Klebs-Lœffler bacillus, the germ already alluded to, may be taken as confirmatory evidence of the disease.

In the present state of knowledge it does not seem possible to differentiate with absolute certainty between membranous croup which is non-infectious in character and which is probably relatively infrequent, and diphtheria affecting the larynx. The absence of constitutional symptoms and of local manifestations of diphtheria elsewhere, and inability to demonstrate the presence of the germ in portions of expectorated membrane are presumptive evidence of the non-contagiousness of the attack.

Cases of diphtheria sometimes occur in which there is an erythematous rash which may lead to confusion in diagnosing them from scarlet fever. For the points of distinction the reader is referred to the article on the latter disease.

Nursing.—The air of the room should be kept warm and moist, especially where there is a tendency to laryngeal involvement. Fresh air should be freely admitted and disinfectants employed to keep it pure. Pieces of ice may be allowed for the patient to suck and cold applications be made to the throat. Liquid nourishment should be systematically given.

Treatment.—1. In severe cases whiskey should be given every two or three hours in teaspoonful doses to sustain the vital forces.

2. The use of calomel and corrosive sublimate has its advocates, and while other plans of treatment are now more generally in use the benefit from their employment under suitable conditions seems incontrovertible. The writer has seen numerous cases in which the most violent symptoms, growing steadily worse, abated with surprising rapidity in response to the administration of from five to ten grains of calomel given hourly to a child until several characteristic movements of the bowels were produced. Corrosive sublimate in doses of about 1-100 grain have then been advantageously employed.

3. The local employment of lactic acid, one drachm to three ounces

of lime-water, or of pancreatic extract, pepsin or vegetable pepsin, for the purpose of dissolving the membrane is advocated by some. Inasmuch, however, as the constitutional symptoms persist in spite of the removal of membrane and as its presence is usually not a menace to the patient the advantage of the practice is not apparent. It is of benefit, however, to use antiseptics locally. Peroxide of hydrogen diluted with an equal amount of water may be used as a spray every hour or two or weak solutions of formalin.

4. Iron and chlorate of potash have long been used, both for their local effect and their constitutional action. A mixture of this sort is of benefit:

Tincture of chloride of iron	1½	drachms
Chlorate of potash	48	grains
Glycerine	4	drachms
Water enough to make	3	ounces

Dissolve, and give a teaspoonful every two hours.

5. When the larynx is involved inhalations of the vapor of lime-water, especially in combination with liquor potassæ in the proportion of one drachm of the latter to one pint of the former, aid in dissolving the membrane. A blanket should be suspended over the bed in such a way as to form a tent, beneath which should be used a croup kettle or steam atomizer containing the liquid.

6. In cases which become progressively worse, and in which the signs of non-oxygenation of the blood indicate that death is imminent, tracheotomy in which the trachea is cut open, or intubation, in which, without cutting, a tube is inserted into the larynx through the mouth, will often save life if resorted to sufficiently early.

7. Tonics and reconstructives are needed in convalescence, and quinine, iron, arsenic and the hypophosphites, and the use of the most nutritious foods are indicated.

8. Antitoxin. Within the last few years the use of antitoxin, both as a means of prevention and of treatment, has been warmly debated. While its enthusiasts favor its employment in every case presenting symptoms of diphtheria, without even waiting to establish a diagnosis, in case doubt as to the character of the ailment exists, the more conservative men in the profession, who still have faith in its utility and efficacy, believe that the field for its employment should probably be limited to cases which present

methods of treatment. To procure good results, however, the remedy should be used as early as possible in all cases.

The improved methods in the manufacture of this product and its increasing reliability are fast gaining advocates for its more universal adoption.

In a child over two years of age from 1,000 to 1,500 units is the usual dose, or if the case is very severe, 2,000 units. The serum is very slowly injected beneath the skin, in the loose cellular tissue, preferably at the side of the abdomen, and allowed to be absorbed without friction. In from twelve to eighteen hours the dose is repeated if there is no improvement, and a third dose, usually of one-half the amount first used, may even be necessary. As an immunizing agent 1,000 units may be employed. The immunity conferred does not last a great while, probably less than thirty days, so that with new exposures, repeated immunization is necessary.

WHOOPING-COUGH.

General Consideration.—Whooping-cough or pertussis is a contagious disease, mainly of childhood, characterized by catarrh of the air passages and a significant cough. It is communicable from person to person by the breath and bodily exhalations and by the agency of apartments which have become infected. It is not the harmless disease which it is so often regarded as being, for aside from the deaths which result from the disease itself, there are very many which are indirectly traceable to it, owing to complications and the after-effects of the disease.

Symptoms.—For a week or ten days these are the symptoms of an ordinary cold, with cough, slight fever, and so forth. The cough gradually increases in severity and assumes the spasmodic character which gives to the disease its name. The paroxysms consist of a series of short expulsive coughs, in which the child often becomes blue in the face and apparently on the verge of suffocation, when a long drawn, noisy, whooping inspiration occurs. Thick stringy mucus is expectorated, often with vomiting, and sometimes with hemorrhages from the nose, lungs and so forth. Several of the attacks may follow each other in close succession and then a respite of varying length occurs. After several weeks the paroxysms become less frequent and less violent, and finally cease, although for many months mild attacks may be induced by transient colds, crying, and so forth. While one attack usually confers immunity, it is frequent for other members of the family in which the disease occurs to be affected by a nervous cough, closely simulating the true disease.

Nursing.—Except in very severe cases, with complications, or where the patient becomes exhausted from loss of food, it is not necessary to confine him to the bed or the house. An abundance of fresh air is desirable, although this must be secured without exposing other children to the danger of infection.

Treatment.—1. Inhalations by means of a steam atomizer or croup kettle, of medicated steam often afford relief to the paroxysms, limiting their frequency and severity. For this purpose carbolic acid, which may be advantageously combined with an alkali is recommended, as in the following formula, used by Dr. J. Lewis Smith, late of New York, and Dr. John M. Keating, late of Philadelphia:

Crystallized carbolic acid	3 grains
Borax	20 grains
Bicarbonate of soda	20 grains
Glycerine	1 ounce
Water	1 ounce

Some of the crude coal tar products, such as cresol, have proved markedly beneficial by inhalation.

2. Internally, belladonna has long been employed with a fair measure of success. For a child of five years, six or eight drops of the tincture should be given night and morning, until the characteristic dryness of the throat is produced.

3. Antipyrine in doses of three or four grains several times daily is often helpful, but must be given with care on account of its depressing effect on the heart.

4. Bromide of potash, from three to five grains, every three hours is useful where the nervous element of the disease is prominent.

5. Bromoform, a drop for each year of the child's age, given every three or four hours, is one of the most satisfactory of the more modern remedies.

MUMPS.

General Consideration.—Mumps, parotitis or parotiditis, is an infectious disease in which inflammation and swelling of the parotid gland occurs. Its symptoms develop from twelve to twenty-one days after exposure to the contagion. Unless complications occur, it is not a serious malady.

Symptoms.—Slight fever, swelling and tenderness of the parotid, and sometimes submaxillary and sublingual glands, with or without pain,

are the main symptoms. The swelling extends both in front of and behind the ear, and eating, swallowing and even speaking may be difficult. The secretion of saliva is at times increased, at others, diminished. Either one or both sides may be affected, and in the former cases the immunity which is conferred by one attack is limited to the side which was involved. After lasting for a week or ten days, recovery rapidly takes place. Among the complications are the occurrence of orchitis and occasionally of mastitis.

Nursing.—Care should be taken to avoid exposure to cold and the patient should be fed on liquid and soft foods.

Treatment.—Nothing more than a mild laxative and a slight fever mixture is required. Either heat or cold, whichever is most comfortable, may be applied, and an ointment of ichthyol and lanoline one part to four, or camphorated oil.

MISCELLANEOUS DISEASES.

In addition to the contagious diseases, both eruptive and non-eruptive, are several which, though not confined exclusively to children, occur so often in them as to require consideration.

ST. VITUS' DANCE.

General Consideration.—St. Vitus' dance, or chorea, is a disease of the nervous system, characterized by involuntary and irregular muscular movements, without consciousness being suspended. There is a marked connection between this disease and the occurrence of acute rheumatic fever or inflammatory rheumatism and of endocarditis, or inflammation of the membrane lining the heart's cavities. It more frequently is seen in those having a pronounced nervous temperament and there appears often to be a family predisposition to the disease.

Strong emotional occurrences, such as deep grief, fright, and so forth, are sometimes the exciting causes, as are also great nervous strain and mental application.

Symptoms.—Every effort of the patient to perform a voluntary muscular act is attended by irregular spasmodic movements, over which he has no control, and the stronger the effort made, the more pronounced is this condition. The symptoms generally come on gradually, though sometimes suddenly, beginning usually in the hands and arms and extending to the face and legs. One or both sides may be involved and the move-

ments may be general or confined to a few muscles. During sleep they are rarely continued. The disease may last for a few weeks only, or may persist in spite of treatment for many months or even years. It frequently recurs, especially in the spring of the year.

Nursing.—1. Rest in bed, quiet and separation from those members of the family who are not actually engaged in taking care of the patient should be secured. The general improvement of nutrition by means of good food and tonics should be aimed at and efforts made to overcome any impairment of the digestive function. After a few days of rest, which in very severe cases may have to be obtained by gentle restraint of the active muscles, massage and carefully regulated Swedish movement will be of advantage. Spraying the spine with ether is sometimes beneficial.

2. Iron in assimilable form, as the peptonate, is useful. The arseniate of iron in doses of 1-100 of a grain or more three or four times a day is an eligible preparation.

3. Arsenic in the form of Fowler's solution (liquor potassæ arsenitis) is more employed than any remedy. For a child of eight years five drops may be given in water three times a day after meals, and the amount increased until the constitutional effect is produced.

4. Strychnine has also been employed in many cases with good results. Beginning with a dose of 1-150 of a grain it may be increased until its physiological effects are noticeable.

INCONTINENCE OF URINE (Wetting the Bed).

General Considerations.—Incontinence of urine or eneuresis is a disease frequently occurring in children, both in acute and chronic form.

Sometimes due to malformations of the bladder it is more often caused by irritation due to too great acidity of the urine, stone in the bladder, phimosis and the presence in the rectum of worms or of a fissure. Or it may be due to weakness of the muscles of the sphincter controlling the bladder, to their being in an irritable condition, or to an excessive secretion of urine. It is the form occurring at night with which we are particularly concerned.

Treatment.—Manifestly the treatment must depend on the condition present.

1. Too great acidity is readily cured by administering liquor potassæ (solution of potash) in five-drop doses every three hours in a wineglassful of water, and continuing it for a while after the urine has become neutral or alkaline in reaction.

2. Where there is too great contractile power of the muscles, belladonna should be given in five-drop doses of the tincture, at bed-time, to a child of five years, to be increased if not productive of good results until pronounced dryness of the throat occurs. If it is beneficial it may have to be continued for some time to avoid a relapse.

3. Where there is a lack of tone to the muscles, extract of nux vomica and ergot are often useful.

4. An excessive amount of urine may be controlled by limiting the fluids taken before retiring for the night.

5. The other causes of incontinence must receive their appropriate treatment.

The following prescription is useful in many cases:

R.—Tr. Belladonna	1½	drachms
Syrup ergota fld.	3	drachms
Syrup rhubarb	1	ounce
Syrup q. s. ad.	4	ounces

A teaspoonful three or four times a day for a child of five and larger doses in proportion to the age.

WORMS.

General Considerations.—Several forms of worms infest the intestinal tract, the most common of which, in this country, are the "round worm," "thread worm" and "tape worm."

Round Worms.—The round worm or ascaris lumbricoids is reddish or yellowish-red in color and cylindrical in shape, with tapering extremities, resembling somewhat the ordinary earthworm. From the intestinal canal it may travel to any part of the alimentary tract, and has been found in other parts of the body. They may occur singly or in large numbers.

Thread Worms.—The thread worm, pin worm or oxyuris vermicularis is a small whitish worm inhabiting the rectum and colon.

Tape Worm.—Of tape worms there are two kinds common in man, the tænia solium or pork tape worm and the tænia saginata or beef tape worm. The latter is the larger, often being twenty or more feet in length. Its head is provided with "suckers," by means of which it adheres to the mucous membrane of the intestine; the pork worm has also hooks which it inserts and secures a firmer hold. The entire body may be cast off, yet if the head remains a new body will grow in the course of a few months to as large a size as the first. The body is composed of small flat segments, appearing like a piece of tape marked into squares or oblongs. Separate

segments or continuous ribbons of segments are often passed and are for a short time endowed with slight mobility.

Symptoms.—Various nervous and digestive disturbances may be produced by the presence of worms, or there may be no constitutional symptoms whatever. The thread worm causes intense itching in the rectum, especially at night.

Treatment.—1. Round Worms.—Santonin, three grains, or given in divided doses, followed by a saline laxative or a dose of calomel, is one of the most satisfactory plans of treatment. It may need to be repeated on several successive days.

2. **Thread Worms.**—Santonin and laxatives are also useful in treating this form of worm. Injections of quassia and water (a handful to a quart), of salt water or of carbolic acid and water (ten grains to a pint) are also advisable.

3. **Tape Worm.**—For two days before beginning the treatment the diet should be light, and for a full day only milk with a little bread should be allowed. A laxative should be given, and on the following day a drachm or two of the oil of male fern, preferably in capsules. This should be followed in about two hours by a dose of castor oil or of citrate of magnesia.

When the worm is passed careful examination should be made for the head. An infusion of pomegranate root, or its active principle pelletierine, is also one of the best remedies known. Or three or four ounces of pumpkin seeds may be bruised, soaked for twelve hours in water, and the liquid, or preferably the entire preparation, taken at once.

INFANTILE PARALYSIS (Epidemic Acute Poliomyelitis).

Infantile paralysis is a disease which, no doubt, has existed unrecognized for centuries. It has spread throughout this country with great rapidity within the last ten years. It is highly contagious and its seriousness must be appreciated when we consider its high death rate of 15 to 30 per cent. in recent epidemics which occurred in different States. The serious danger in contracting infantile paralysis lies in its leaving the patient in most cases, a hopeless paralytic and deformed, rendering them sometimes a helpless victim and a care upon their parents or society. It makes its appearance suddenly and silently into a community and strikes down a playful and healthy child; sometimes attacking adults, but

it is considered essentially a disease of childhood. Thus in a few days or weeks numbers of healthy children will be afflicted and rendered permanent paralytics or killed by the disease.

Infantile paralysis is one of the most baffling diseases with which science and physicians have to deal, as its cause and transmission are not definitely known. It has been proven, however, that it is a germ disease by Dr. Flexner, of the Rockefeller Institute, New York, who has produced the same symptoms of disease in monkeys by injecting into their brains and spinal cord an emulsion of a cord taken from a human or other animal that has died of the disease. The germ which causes infantile paralysis is evidently too minute to be seen by the present magnifying lens of the microscope. It is supposed that the disease is caught by coming in direct contact with a sufferer from the disease. Flies are considered as a means of spreading the disease from one child to another. Dr. Pierson, of the Medical Corps of the United States Army, stationed at Fort Gibbon, Alaska, learned while treating some cases of epidemic acute poliomyelitis which occurred among the Indians during the summer of 1913, that the epidemic had been preceded by a severe epidemic of "Distemper" among the Eskimo dogs, and these attacks of distemper resembled the symptoms which the Indians suffered from; furthermore, the dogs died in a day or two and were paralyzed in the legs. These facts led him to suggest that there is a possibility of the epidemic having started among the dogs and contracted by the Indians who live in a dirty state and in close contact with them. He also suggests that as the distemper occurred in the summer months, that flies may have carried the disease from the dogs to the Indians. The disease always disappeared when frost came and fly time was over. He also observed that white people whose dogs had distemper, did not contract infantile paralysis, due to the fact that their dogs did not live in close contact with them, were kept clean and the people lived in a sanitary manner with screened windows and very few flies about. Thus in time science may prove that dogs and other animals with distemper may be suffering from the same disease from which the epidemics of infantile paralysis develop in the human race.

The symptoms of infantile paralysis show themselves without warning in an apparently healthy child or adult. There may not be another case of the disease in the neighborhood or country, when suddenly the victim complains of headache, fever, nausea and vomiting, often rigidity

of the neck and spine and pains in the arms and legs of varying intensity. If the patient doesn't die within two or three days, paralysis occurs in one to six days which involves the legs and the upper part of the body. The paralysis may clear up after recovery. As a rule, though, the child is left a permanent paralytic and helpless in one or more limbs, etc. This paralysis is due to the poison of the germ causing the disease affecting the brain, spinal cord and nerves to the muscles, etc., of the body.

If a person is exposed to a case of infantile paralysis, it will be between two to ten days before they show symptoms of the disease.

How to Prevent the Spread of Infantile Paralysis.—The guardian or parent of the child which shows any of the above symptoms of this frightfully contagious disease must summon a physician who must notify the local health authorities. Place the child in a screened room away from other members of the family, secure a nurse or attendant and whenever possible move the patient to the Contagious Hospital, as this is too dangerous a disease to be treated at home. No one must enter or leave the room except the physician and he must wear a gown upon entering the room, protect his hair with a suitable covering and remove them after leaving the room, and disinfect his hands in some disinfectant solution as bichloride of mercury (1 to 2,000) or carbolic acid (5 per cent.). The nurse must wear a cap and gown and change her clothes when leaving the room and disinfect her hands. All discharges from the patient must be collected and disinfected with chloride of lime solution (one-half pound to a pail of water), also all bed linen, clothing, dishes, etc., must be dipped in this solution before being taken to the kitchen and scalded.

Hang a sheet over the door dipped in chloride of lime solution. Don't allow a fly or other insect to live in the room. Don't allow family pets to remain in the house. Chain them outside. Destroy all food from the patient's room. Don't allow anyone in the sick room but the physician, nurse or attendant.

When the case has recovered, the Board of Health will disinfect the room. Be sure and leave all carpets, curtains, clothing, bed linen, nurse's clothes, etc., spread out upon chairs and tables so that the disinfectant can come in contact with them.

Persons in the house must obey strictly the rules of quarantine and prevent the spread of this disease. They must not attend to business unless they bathe and wash their hair if exposed. Do not wear the clothes which were worn when in contact with the sufferer until fumigated by

the Board of Health. Public places where numbers of people congregate, must be avoided. Milkmen must not remove bottles until told to do so by the Board of Health.

Remember, infantile paralysis occurs in the summer months. So kill all flies, and screen windows and doors.

PART XIV OF BOOK IV

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CURATIVE MEDICINE

PART XIV.

SURGICAL DISEASES

BACTERIOLOGY, INFLAMMATIONS, CONTUSIONS, WOUNDS, ETC.

Bacteriology.—Bacteriology is the science which treats of germs. Their discovery within a few decades has wrought a revolution in surgical treatment. No intelligent understanding can be had of the principles of surgery without at least some elementary knowledge of bacteriology. For its more complete discussion see the special article upon the subject.

Micro-Organisms, Germs, Bacteria or Microbes are minute vegetable cells, most of which can be seen by the microscope only. They are widely distributed, being in the air we breathe, food, water, in the soil, on vegetable and animal matter either living or dead. They form a microscopic flora, a vast vegetable world, with varieties probably as innumerable as the vegetation with which we are so familiar. Some microbes when introduced into the system are non-disease producing, harmless. Others are pathogenic or disease producing, most virulent in their action.

Yeasts include several species of germs, the action of which, in bread raising and in producing alcoholic fermentation, is familiar. They are, for the most part, harmless to the human system; one variety, however, grows upon the mucous membrane as thrush.

Molds represent another class, familiar to us in their growth upon old leather and upon stale bread.

Bacteria.—The sub-class of germs known as bacteria are the ones of chief interest to the surgeon. Of the three forms, coccus, berry-shaped or round; bacillus, rod-shaped, and spirillum, corkscrew-shaped; the latter plays no rôle in surgery.

Growth of Bacteria.—Bacteria may multiply with amazing rapidity. Under ideal conditions a single cell in one day will have sixteen million descendants, and in three days the mass of new cells would weigh 7,500 tons. Multiplication is chiefly by subdivision, one cell dividing into two, the two into four and so on; or by "seeds," called spores.

Soil for Bacteria.—They require a suitable substance or "soil." Some grow better upon living matter, others upon dead. Most of them are readily grown artificially upon the blood serum of an animal, a suggestion as to the favorableness of the human tissues for a soil. They need heat and require water. Most grow better when exposed to the oxygen of the air, but a few better when air is excluded.

Lock-Jaw.—The bacillus of tetanus or "lock-jaw," is one of the latter class. The dust of out-buildings, the soil of gardens are favorable places for the growth of the tetanus bacillus. "Rusty" nails are common about such places. A wound is received by such a nail. The patient possibly develops lock-jaw, not because (as is popularly believed) the nail was rusty, but because, among the minute particles of dirt upon the instrument were the germs of the disease. The depth of this small wound, the superficial tissues closing and excluding the air, thus give a most favorable nidus for the growth of the tetanus bacillus.

Sunlight and Bacteria.—Sunlight antagonizes the growth of most germs. Temperature is a most important factor. The body temperature is a favorable one for many pathogenic germs. Freezing, or even a temperature of 200 degrees Fahrenheit below zero, does not kill bacteria, but only arrests their growth. Favorable temperature will again restore their activity. High temperature, on the contrary, destroys them. The Jewish idea of purification by fire was based upon a scientific fact. As a practical fact boiling water kills in a few minutes most disease-producing and death-dealing germs.

Special Surgical Germs.—There are quite a known number of germs which are particularly the surgeon's enemies. Such are the following:

Pus-Producing Germs.—Pus-producing (pus being commonly called "matter") micro-organisms, of which there is a large variety of cocci, must always be reckoned with. It must be understood that pus can be formed only by the presence, growth and action upon the tissues of some of this variety of germs. The formation of pus is called suppuration; the term purulent means pus-like or forming pus.

The Bacillus of Tuberculosis forms "cold" abscesses, produces "white swelling," Pott's disease, scrofulous conditions, besides the dread disease

of consumption of the lungs. There is not a tissue of the human body which it may not ravage.

The Coccus of Erysipelas, the coccus of gonorrhea, the bacillus of tetanus, the bacillus of syphilis are common combatants of the surgeon.

Introduction of Microbes into the System.—A most important and practical question arises, How do disease-producing germs gain entrance into the living tissues? We daily breathe, eat and drink germs and are clothed in them. All common objects, including clothing, coming in contact with the skin, deposit bacteria upon it, so that unless rendered free from them, by special means, there is no portion of the skin upon which they do not exist. Keen says that the hands of the bride at the altar are surgically filthy.

Abundance of Germs.—Germs being plentiful in air, food and drink there is scarcely any portion of the lining or mucous membrane of the alimentary (food) canal or of the respiratory passages but what is in contact with them. Let the skin and mucous membrane be healthy and very few microbes enter the tissues; they are cast off harmlessly. But let there be inflammation or some unhealthy state of the surface, especially some "raw" spot, though ever so little, a prick, a scratch, the slightest break of skin or mucous membrane and the door is wide open for the entrance of the host.

Tissues that Assist Germs.—Providentially, certain tissue elements, notably the white blood cells and blood serum, have great capability of destroying germs which gain ingress into the system. "There is a battle royal between the invading host of germs on the one side and these defensive elements upon the other." If, for a time, the germs gain the ascendency, manufacturing their poisonous products, as they do, the subject is ill. Whenever the protective elements are conquerors the subject remains unharmed—in health. If, for any reason, a person becomes debilitated, the germ killing power of the tissue cells is less vigorous; if any portion of the body becomes injured this reduces the cell vitality at such site. The latter conditions thus render the tissues a favorable soil for germ growth.

Definition of Terms.—A germicide or disinfectant is an agent fatal to bacteria. The destruction of germs in clothing, in excrement, in a wound, on the hands, and so forth, is called disinfection. Disinfection of a wound, dressings or instruments is called sterilization. An antiseptic is an agent which retards or prevents the growth of germs. By sepsis or infection is commonly meant a condition in which disease-producing germs

are present, *e. g.*, a septic or infected wound. Asepsis means, commonly, the absence of bacteria.

Disinfection or Sterilization.—The paramount object of the surgeon in every operation to-day is to have the field of operation and all objects coming in contact with the wound as free from bacteria as may be—to do an aseptic operation. If the area of operation is already infected, for example, an abscess to be opened, he uses the antiseptic method. Three means of sterilization are available, as follows:

1. **Thermal Disinfection** consists in the use of heat in the form of boiling water, steam or hot air. By this means everything concerned in an operation may be sterilized except the skin of the patient and the operator's hands. In a modern hospital special sterilizers are used in which dressings, towels, sheets, operating gowns and so forth, are subjected to steam under high pressure. These articles, wrapped in sheets or placed in sterile jars, are not disturbed until the time of operation and are then handled with sterile hands. As a practical fact, simple boiling for fifteen minutes is a most efficient method of sterilizing, and the one which is universally used for instruments. Any clean, flat pan may be used for boiling the instruments. A teaspoonful of cooking soda to the pint of water should be added.

2. **Chemical Disinfection.**—Many chemicals will kill bacteria, but the most reliable and the one most common is bichloride of mercury or corrosive sublimate. (Bear in mind that it is a rank poison.) It is used in the strength of 1 part of the drug to 1,000, 2,000 or more of water. Seven and a half grains make, when added to a pint of water, a 1 to 1,000 solution. It is put up in tablets, each one containing seven and a half grains. Needless to say, it is not used upon mucous or serous membranes except in very weak solutions (1 to 4,000 or more). It cannot be used for the sterilization of instruments as it corrodes all metallic substances.

Carbolic Acid is valuable as a germicide in the strength of 1 to 40 or 1 to 20 parts of water. In such strength of the solution instruments are sometimes placed during operation, and it is occasionally used in cleaning the skin.

Creolin and Lysol may be used in one per cent. or two per cent. solutions upon the skin or instruments, but are chiefly employed in the former strength for vaginal and uterine douching.

Hydrogen Peroxide is an excellent agent for cleansing infected wounds. The common form should be diluted one-half or two-thirds. It is most conveniently used with an atomizer.

Normal Salt Solution, made by adding a teaspoonful of table salt to each pint of water and boiling to sterilize, is mildly antiseptic in action. It is much used for flushing out cavities of the body, *e. g.,* the abdomen where strong antiseptics are injurious. It is often used with great advantage to cleanse large superficial wounds, such as burns or to saturate dressings applied wet. As a simple ready household remedy for cleansing wounds, gargling the throat, and so forth, it is frequently valuable.

Boric Acid in a saturated solution (fifteen grains to the ounce of water) is mildly antiseptic and is very commonly employed for cleansing wounds of the mouth, nose, for washing the eye in inflammations. It is a useful remedy and may be employed freely with impunity upon the most delicate tissues. In the form of powder it is frequently, with good effect, applied to cuts or other wounds.

Iodoform, in powder, is a valuable antiseptic and is much used for dusting purulent or suppurating areas. It is particularly useful in tuberculosis foci. Cheesecloth impregnated with it is largely used for draining wounds, keeping abscesses open, for packing cavities to arrest the oozing of blood.

Acetanilid, a white powder, is a fair substitute for iodoform, except that it probably does not benefit tuberculous conditions and should be used with caution.

3. **Mechanical Disinfection.**—This consists practically of thorough washing with soap and warm sterile water. It will be described in detail under the next heading.

Preparations for an Operation.—The patient should be prepared the day previous. Suggestions for such preparation are found in the chapter upon Anesthesia. A room for operation should contain as little as is essential for the necessities of the case. Some graver operations, such as those upon brain, lungs or abdominal cavity had much better be done in a hospital with all modern equipments and conveniences. However, the room of a private house may be rendered fit.

A Fit Operating Room.—A room should be well lighted and ventilated and warm. The day before operation curtains, all hangings and carpets should be removed. The floor must be thoroughly scrubbed, the walls and ceiling brushed, or better, washed. Air, unless dust-laden, does not carry germs in sufficient numbers to infect the wound seriously. The room is to be well aired and dried. The day of operation a table (a kitchen table does well) is provided for the patient upon which are placed

a folded comfortable or folded blankets. A rug or piece of carpet is spread beneath the table.

Other Preparations.—Two or three other tables or stands are placed near for instruments, basins and dressings. Buckets for the slops should be placed near. Several gallons of water thoroughly boiled must be provided. A portion should be hot, but much of it should be cooled by setting it aside in clean vessels under cover. A half dozen clean sheets and a dozen small towels should be at hand. A stove furnishes heat for boiling the pan containing instruments.

The Surgeon's Preparation.—The surgeon and his assistants remove their coats and roll the sleeves above the elbows. The hands and arms are to be freed so far as possible from germs—to be disinfected. A common and good method is as follows: Trim the nails short, clean well under them, removing also any excess of skin at the roots. Scrub the hands and forearms very thoroughly for five minutes or more with hot sterile water and a good soap, such as castile. A nail brush must be used; scrub very carefully about and under the nails and between the fingers. Give particular care to the creases of the hands. The nails are again cleaned with a knife and the hands afterward scrubbed. The hands are now thoroughly washed in plain sterile water and had better be dipped in alcohol for a few moments. The hands are last scrubbed for at least a minute in bichloride of mercury, 1 to 1,000, careful attention being given to the region of the nails.

The surgeon and assistants now envelop themselves in sterile gowns and scrupulously avoid touching any object which had not been sterilized.

The Assistant's Duty.—Meanwhile one assistant has sterilized the skin of the patient. The field of operation, including a wide area about the place of incision, should have been, the day before, shaved if hairy, sterilized, and meanwhile protected with sterile dressing. Whether so or not, the part, by the method used for the surgeon's hands, is disinfected immediately preceding operation. Sterile sheets and towels are now spread over the patient about the area of operation, leaving only a small portion exposed. With sterilized instruments and sponges (the latter preferably being a small strip of cheesecloth rolled into a mass) sterilized material for tying blood-vessels and suturing the wound, the surgeon is disappointed if he does not have an aseptic wound—one that heals readily without pus formation. In such an operation chemical antiseptics, which are irritant, are avoided. If, however, a purulent condition existed prior to operation, *e. g.*, an abscess, chemical disinfectants, notably corrosive

sublimate solution, are, in addition to the former method, freely used, and the wound is probably left wide open for drainage of the pus.

Infection of Wounds.—Any wound accidentally received is infected, from the instrument wounding, from clothing, soil ground into it, in fact, anything coming in contact with it. One object of highest importance is the disinfection of such wound. For further discussion see Wounds.

Tying and Sewing Wounds.—For tying or ligating blood-vessels, silk or catgut, usually the latter, is used. For sewing or suturing a wound, catgut, silk, silk-worm gut, or silver wire are common. Catgut must be prepared by a special process. The other material is best sterilized by boiling.

Dressings for Wounds.—Dressings may be made of any material which readily absorbs wound fluids. Cheesecloth is best. This, together with gowns, sheets and towels is not readily prepared without special sterilizers. In emergency, however, after boiling, drying and wrapping them in sheets or towels they may be baked. Or clean unsterilized sheets and towels may be wrung out of bichloride of mercury solution and thus, damp, be put about the site of operation. Unsterilized dressings may be treated likewise, and so placed upon the wound.

CONTUSIONS AND WOUNDS.

Contusions.—By a contusion or bruise is meant the crushing or laceration of tissues beneath the skin, the latter remaining unbroken. Blood is poured out into the injured tissue making it "black and blue." The effused blood will, as a rule, be gradually absorbed and the injured tissue restored. Suppuration or gangrene rarely occurs.

Symptoms.—The symptoms are swelling, tenderness, numbness, followed by aching pain. Discoloration sooner or later appears. Loss of function may occur, and, in severe contusions, shock may be great.

Treatment.—If shock is present, reaction from it should be secured by rest in bed, stimulation and external heat. Rest and elevation of the injured part are of prime importance. Application of cold is indicated, except in very grave contusions, and in the feeble and aged. Heat, instead, is indicated in such cases. Compression by firm bandage is useful for the arrest of hemorrhage and to antagonize swelling.

Accessory Treatment.—The constitutional treatment is the same as that for inflammation. Massage, liniments, applications of ichthyol ointment and motion are essential in the late stages of contusions.

Wounds.—A wound is an injury in which there is a break or division of the tissues by some sudden force. In the sense here used, the term includes tearing or dividing of the skin. Wounds comprise cuts, stabs, gunshot wounds, bruised and torn wounds, poisoned wounds, and so forth.

Danger from Wounds.—The danger of a wound depends upon its depth and size, and above all upon the importance of the underlying parts involved, such as arteries and nerves, or vital organs, such as the heart and lungs. Stabs and gunshot wounds are generally far more dangerous than would appear from their size, because they are apt to involve vital portions of the frame, and also because pieces of the weapon or of the bullet may be left remaining in the wound, as was the case with the lamented President Garfield.

Healing of Wounds.—The healing of wounds occurs in two ways:

By First Intention.—In the first place, a wound may heal by primary union, or, as it is also called, union by the first intention, without the formation of any pus or matter, and leaving only a very line-like scar. This mode of healing should always be sought for, but can seldom be obtained, except under the following conditions, to wit: when the sides of the wound can be accurately fitted together, and are not subsequently displaced by bleeding or the exudation of matter, also when the wound is left quiet and protected from outward injury, and when it is kept free from impurity.

Healing by Second Intention.—The second mode of healing takes place slowly, with suppuration and the formation of little rounded knobs, called granulations, all over the raw surface, and leaves a large, red scar, ultimately becoming dead white. This second and far inferior method of healing is observed when the favorable conditions just mentioned are absent, as for example, first, when so much of the skin has been destroyed that the edges of a wound cannot be brought together, as in wounds caused by cannon balls or shells, in scalp wounds from blunt instruments, or where the edges of wounds are so torn and bruised that their life is crushed out; second, where the edges of wounds are separated after they were adjusted, by blood being effused, or by the formation of pus; third, when the injured parts have been disturbed, as, for instance, in the leg, by standing or walking, or the hand and arm by working, and so forth; or, if the wounded party has been badly transported from the scene of the accident; or, lastly, when the wound was dirty and had not been properly cleansed or disinfected, because want of cleanliness leads directly to putrefaction and the formation of pus, and it is especially the matter formed in

the process of suppuration which separates the sides of wounds and prevents their healing by the first intention.

Proud Flesh.—When the wound does begin to heal in the second and inferior method, granulations form, which are often called proud flesh, and are especially dreaded by ignorant persons as dangerous intruders into a sore. These granulations by degrees organize into a living tissue of great firmness, and after they have filled up the cavity of the wound to the level of the surrounding cutaneous surface, or sometimes a little above it, they cover themselves with epidermis and constitute a scar.

Symptoms.—The symptoms of a wound are constitutional and local. The constitutional or general effect of a serious wound is called shock. In shock, sudden depression of the vital powers occurs. There is general weakness; a faintness, with sometimes loss of consciousness; the pulse is feeble and rapid; skin pale, cold and clammy; the bodily temperature is lowered; nausea with vomiting may occur. Loss of blood may be a strong factor in producing shock.

Reaction from Shock.—During and following the arrest of hemorrhage, reaction from shock is to be sought by raising the feet and lowering the head; at least place the head flat, and the lower extremities quite as high as the head; wrap the patient in warm blankets and surround him with hot bottles, hot bricks and so forth.

Stimulants.—A tablespoonful of whiskey or brandy may be given by mouth every half hour. An enema of black coffee one-quarter pint and whiskey two tablespoonfuls is excellent. Injections under the skin of whiskey, strychnine, digitalis, are invaluable. In the graver forms the injection of large quantities of warm normal salt solution beneath the skin, into the bowel or into the veins should be practiced.

Local Symptoms.—These are hemorrhage, pain, loss of function and gaping of the wound edges.

Treatment of Wounds.—The steps in treatment of a severe wound are given in order as follows:

Arrest of Hemorrhage.—The fact that hemorrhage may readily prove fatal, or, as it is popularly phrased, the person may easily bleed to death, is so important that a detailed discussion is needful. Every wound bleeds, because in every wound blood-vessels are injured. But the kind of hemorrhage, as well as its danger, varies with the size and the nature of the blood-vessels which have been divided. If the blood does not flow freely, but trickles from the wound, one may conclude that only small blood-vessels have been severed. When dark blood wells out in a steady stream,

and when the flow is increased by pressure above the injured spot, that is, nearer the heart of the patient, a large vein has been opened. Lastly, when bright, red jets spurt out of the wound, forcibly, and in jerks, an artery is divided and danger to life is great and immediate.

Smaller Wounds.—Unimportant hemorrhages from very minute arteries, and from veins of only moderate size, can generally be arrested by pressure upon the wound itself, or by pressing the sides of the cut against each other, or it may stop of its own accord in consequence of the mouths of the vessels contracting and the blood in the wound coagulating into a tough, viscid mass.

Hemorrhage from an injured vein, as, for example, that from the giving way of a varicose vein in the leg, is sometimes difficult to check, on account of the pressure of some light article of clothing, such as a garter, above the bleeding point. On loosening this, slight pressure upon the wound and elevation of the foot above the level of the hip surface to arrest the bleeding.

Control of Hemorrhage by Compression.—If, however, bright, red blood continues to flow, in spite of pressure over the wound, a large artery must have been injured, and speedy death from loss of blood must be apprehended. In such instances, prompt aid is necessary, and a physician or surgeon should at once be sent for.

Where to Place Pressure.—Until he arrives any intelligent person can probably succeed in checking the flow of blood by making very firm pressure on the wound itself, if it is small, or on the trunk of the artery above the wound. The injured limb should be raised, as this lessens the force of the pulse in it, and, of course, the violence of the flow of blood. After cutting the clothing away from the source of hemorrhage, a folded piece of clean linen, or a pocket-handkerchief, should be laid on the wound, and fastened firmly down by means of a bandage or another handkerchief. But if, in spite of this, the blood still continues to run, the trunk of the artery between the heart and the wound must be sought for and firmly compressed by the fingers, the handle of a large key, or some other suitable object. In certain parts of the body the arteries lie so near the surface that they can be effectually compressed with the fingers.

Pressure on Arm Artery.—In the upper part of the arm the main artery courses along the inner side, nearly in a line with the inner seam of the coat or dress sleeve, as is shown in the accompanying figure. By feeling along the place indicated by the dotted line, it is easy in any spare person to discover the strong pulsation of this large artery of the arm, or

brachial artery, as it is technically called. The artery may be compressed in this position by placing a thick stick between the arm and the chest, and tying the arm tightly to the body, or by pressing the artery firmly against the bone of the arm with the thumb, as shown in the illustration.

Diagram of Main Artery of the Arm.

Pressure at Collar Bone.—Sometimes, when the wound is higher up on the arm, or in the arm-pit itself, it may be necessary to compress the artery at a point nearer the heart; and this can usually be accomplished by making pressure with the thumb or a big key, just behind the collar-bone, as is also indicated.

The Spanish Windlass.—If it is found difficult to continue the application of force in these situations, or if the only person present must leave the sufferer whilst he hurries off for assistance, the little device known by the name of the Spanish windlass should be resorted to. To apply this, take a large handkerchief and fold in it a rounded pebble about an inch in diameter, or any other smooth, hard body of similar size; fold the handkerchief cravat-shape, and tie it loosely about the limb, at the point where pressure is to be made upon the artery; and then, putting a stout stick beneath the loop, twist it around so as to tighten the handkerchief and bring a strong pressure upon the stone underneath the loop on the side opposite to the stick, which in its turn compresses the artery and stops the flow of blood. This is, of course, a much more painful, as it is a more powerful method than pressure by a bystander's thumb or finger; but in urgent cases it may be needful to call it into service in order to save life.

The Tourniquet.—The Spanish windlass is a rough imitation of the surgical instrument called a tourniquet, which is far preferable as a means of arresting hemorrhage whenever it can be procured. As soon as a tourniquet can be obtained, it should be substituted for the primitive and painful windlass, which, if continued several hours upon a limb, might itself lead to mortification of the part, and perhaps to a fatal result.

Treatment With a Handkerchief.—In order to check bleeding from wounds in the arm below the elbow, or about the hand, where workmen of all kinds are particularly apt to receive injuries, take a large hand-

kerchief, as before, and tie up in it a stone or a potato of the size of a walnut, or a simple, large, hard knot will perhaps answer the purpose. Then fasten it loosely about the arm, just above the elbow, as shown in the illustration, and bend up the forearm so as to make the knot press upon the large artery in its position in the hollow of the elbow, as indicated in the accompanying wood-cut. If the hemorrhage is found to be checked, the knot is in the right place at the bend of the elbow; but if blood continues to flow, straighten the arm, move the knot or stone a little, and try again. As soon as you find the flow of the blood is stopped, take another large handkerchief, or a strip of bandage, and fasten the wrist firmly to the shoulder, so as to keep up the life-saving pressure upon the blood-vessel at the elbow.

Method of Checking Hemorrhage in the Hand or Wrist

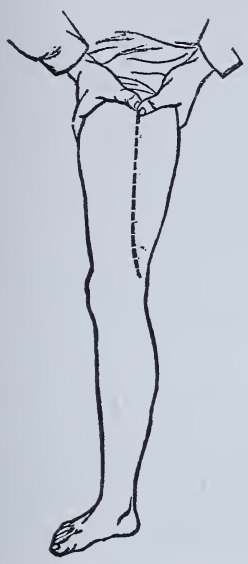
Wounds Below the Knee.—Hemorrhage from wounds of the leg, below the knee, or of the foot, such as are so often inflicted by the slipping of an axe or hatchet in chopping wood, may be controlled in a very similar way by tying a large pebble in a handkerchief, so as to make a knot the size of a turkey's egg, fitting it in the hollow of the knee, and then bending the leg up on the thigh in such a manner as to produce pressure upon the artery, on exactly the same principle as that displayed in the figure just above. When it is found that the knot is properly adjusted, so as to answer the purpose of arresting the flow of blood, the leg should be secured in its doubled-up position in order to prevent a return of the hemorrhage, in consequence of the apparatus becoming displaced.

Thigh Wounds.—For bleeding from wounds in the thigh, the artery must be compressed an inch or two below the middle of the groin, and about as far in front of the usual position of the inner seam of the pantaloons. The exact point is indicated by the marginal illustration, which shows very well the way in which the thumbs ought to be applied.

Pressure on Thigh Artery.—The femoral artery, or artery of the thigh, is so large and strong that its pulsation can usually be felt without much difficulty in thin or even moderately spare persons; and it is a good plan for every one to become acquainted, by examining his own body, with the location of this and other chief arteries. This point in the femoral artery is also a favorable one for making compression in bleeding wounds of the foot and leg.

Fainting Fit.—In whichever way bleeding from an important artery

has been for the time checked, it must be remembered that it is very liable to burst out again the moment the pressure is relapsed or the obstruction removed: also, that when a person faints from loss of blood the hemorrhage ceases whilst the heart is beating feebly in the fainting condition, and the blood may clot quite firmly in the mouths of the divided blood-vessels. When, however, the patient revives the renewed vigor of pulsation in the heart and arteries will generally drive out these recently-formed clots of blood, and the bleeding starts afresh with, perhaps, a speedily fatal result, if a most vigilant watch is not maintained over the wound. Where the hemorrhage is venous only, however, there is a good prospect that the clots of blood formed in the open mouths of the vessels will be able to resist the feebler pressure brought to bear upon them by the reviving circulation, and that bleeding will be effectually checked by the occurrence of the fainting fit.



Course of the Femoral Artery.

Tying of Blood-Vessels.—In order to obtain primary union, it is necessary, in dressing a wound, to stop all hemorrhage. A surgeon grasps with forceps the end of any vessel that bleeds considerably, and before closing the wound ligatures or ties it. Sterilized catgut is best for ligatures, but silk, or even cotton thread that has been boiled, will answer. Simple twisting with forceps will arrest hemorrhage of very small vessels, while oozing is generally controlled by pressure with compresses wrung out of water as hot as can be borne by the hand.

Reaction from Shock.—See Shock.

Cleansing of the Wound.—This includes the removal of both foreign matter visible to the eye, and the removal as well of microscopic germs which contaminate every accidental wound. Have at hand plenty of water and good soap. Scrub the wound and surrounding area thoroughly with soap, with scissors and forceps removing any visible foreign matter (splinters, bits of clothing, grains of dust or hopelessly damaged tissue). Wash with plain water and alcohol and irrigate with corrosive sublimate solution (1 to 1000). If the wound is of a hairy part, the area should be

shaved. All blood clots should be removed and the wound left clean and dry.

Provision for Drainage.—Most accidental wounds, unless small and superficial, should be left partially open for drainage, so that infective material which it has not been possible to remove, may flow out. In such cases, a bit of rubber tubing may extend to the depth of the wound or a strip of iodoform gauze or plain sterile gauze may be gently inserted to the depth of the wound, one end of the strip protruding. A few strands of suture material well serves the purpose.

Closing of the Wound.—Where confidence of thorough disinfection is felt, and the loss of tissue is not too great, the edges of the wound should be brought together and the tissues held in the relation they bore before injury. Sewing or suturing a wound is the best means to this end. Surgeons use special needles and a variety of suture materials: silk, silver, wire, silk-worm gut and specially prepared catgut. In an emergency, however, a large sewing needle and large-sized sewing thread, which have been boiled, may do good service. Interrupted stitches (each stitch tied separately) are usually the better. The edges of a superficial wound may be held together by strips of adhesive plaster placed outside of the dressing of the wound. Or, in slight cuts and abrasions, collodion painted over a bit of dressing is sometimes efficient.

Dressing of the Wound.—Any aseptic or antiseptic material which absorbs wound discharges freely, such as absorbent cotton, cheesecloth or even thin old muslin forms a good dressing. Sprinkling the wound freely with an antiseptic powder helps to prevent suppuration; dressings had better be applied moist, wrung out of bichloride of mercury solution (1 to 2000). Plentiful dressings should be applied, sufficient to soak up the wound discharges and to protect from outside infection. A wound should be disturbed for dressing as seldom as possible. If the dressings become soaked with wound fluid, if there is much pain, or a rise of temperature indicates suppuration, the wound should be freshly dressed; otherwise, the dressing should remain in place a week or ten days.

Securing Rest.—In case of severe wounds, not only should the patient rest in bed but absolute rest to the part should be secured. Compression by firm bandage, an easy position, fixation by splint or plaster dressing, support of the arm in a sling, these all give comfort and hasten healing of a wound.

Constitutional Treatment.—General treatment should be according to the suggestions for the treatment of inflammation; in addition, watch for

suppuration, gangrene, erysipelas or tetanus. Temperature is a good index of the condition.

Punctured Wounds.—Wounds made by sharp instruments (such as a dagger, a splinter, a fork prong, and so forth) have especial dangers, and require radical treatment. Foreign bodies are frequently left at the depth of such a narrow wound; the opening is small and readily closes, locking up infective material; underlying organs of the abdomen, head or chest are liable to injury. Such wounds generally demand the attention of the skilled surgeon. He will usually probe for a foreign body and will generally open the wound to its depth, often incising it freely, in order to disinfect it properly and to allow for drainage. He will determine whether underlying organs are injured and any treatment needed for such.

Gun-shot Wounds.—The special dangers to be combated in gun-shot wounds are shock, hemorrhage and infection. Injury of vital organs is liable. In many cases it is better not to probe for a bullet. The ball should be searched for when it has surely carried in with it foreign bodies; when it is in a vital organ, as the brain; and when its presence interferes with healing.

Poisoned Wounds.—Dissection wound is a term applied not only to wounds received by medical students and surgeons in their dissections, but to wounds sometimes received by butchers, cooks and fishdealers, who handle putrefying animal matter. Such wounds are particularly virulent. A wound of this character should be thoroughly washed, and the blood squeezed out of it. If a puncture, it should be freely opened and swabbed with pure carbolic acid, then washed with bichloride of mercury solution, and wet antiseptic dressing applied. Bites by animals should be so treated, the human bite being one of the worst.

Stings and Bites of Insects.—For the more common and less poisonous wounds, applications of solutions of washing or cooking soda, ammonia water, iodine or lead-water and laudanum, give relief. The bite of a large spider or scorpion should be treated as a snake bite.

Snake Bites.—Copperheads, water-mocassins, rattlesnakes and vipers are the only poisonous snakes of the United States. We have a poisonous lizard known as the "Gila monster." A snake bite must be treated promptly and usually without proper appliances. When the bite is upon a limb, very tightly tie or twist a band or fillet around the extremity above the wound; several such bands are better. Cut out the wound at once, suck the wound, burn it with nitric or carbolic acid or heat. A

hot iron is efficient; hunters may pour powder into the wound and apply a spark or lay a live coal upon it. Constitutionally stimulate freely with whiskey or brandy to sustain the system while it is ridding itself of the poison. Strychnine, ether and digitalis hypodermically are valuable. The fillets should not be removed for some time, and then slowly, one at a time, the uppermost one first.

Hydrophobia or Rabies.—This is an infectious disease due to inoculation through a wound with the virus from a rabid animal. The animal may be a dog, a cat, a wolf, a fox or a horse. About 14 per cent. of the people bitten by mad animals develop the disease and die.

Treatment of Hydrophobia.—When a person is bitten by a supposed rabid animal and is seen soon after the injury, firm constriction of the part above the wound should be made, the wounded area should be freely cut out, burned with a hot iron or nitric acid and dressed with wet antiseptic dressing. If the patient is not seen within a few hours of the injury, cauterization will do no good. In any case, send the patient to a Pasteur Institute for preventive treatment. If the animal causing the wound was not rabid, treatment will do no harm; if it was mad, treatment will probably save the patient.

INFLAMMATION.

Definition.—Inflammation is defined as "the changes which occur in living tissue when it is injured, provided that the injury is not of such a degree as at once to destroy its life." Inflammation may end in return of the tissues to complete or partial health, or in their death.

Causes of Inflammation.—The causes of inflammation are predisposing and exciting. Predisposing causes are such as are present in the tissues and render them liable to inflame; any affection or indulgence which impairs the health or weakens the system is a strong predisposing cause. Exciting causes are injuries; for example, blows, falls, crushes, burns, and so forth.

Symptoms of Acute Inflammation.—Symptoms are general or constitutional and local. The former are manifested chiefly as fever. The latter in an organ or a part, as heat, swelling, pain, discoloration and disordered action or function. Constitutional symptoms of acute inflammation may be absent, but in severe cases they are sure to occur, forming the symptom group known as fever—symptomatic or inflammatory fever.

Chronic Inflammation.—This condition is gradual in onset and progress. There are no constitutional symptoms due directly to the inflamma-

tion. As to local symptoms, there is pain, varying in degree and character; swelling is often great; function is more or less interfered with; heat and discoloration are rare.

Treatment of Acute Inflammation.—The prime rule of treatment is first to remove the exciting cause. If it be a splinter, pull it out; if drink or indigestible food is inflaming the stomach, stop it; scrape out diseased bone, clean out the germs from an infected wound. Further treatment should be both local and constitutional.

Local Treatment of Inflammation.—Two agents are suited to the treatment of both the early and the late stages of an inflammation, namely, elevation and rest. Elevation combats engorgement of the part. A sprained ankle is more comfortable if put on a level equal with or higher than the body. Rest is of utmost importance. Rest of the patient in bed should be insisted upon in every severe inflammation. Rest to an inflamed part is secured by various means. The partial, or better, the complete cessation of the usual action or function of an organ, is desirable. To an inflamed eye, rest is secured by dark glasses, a darkened room, or a pad to exclude the light; to a sprained joint, by an easy position and fixing it on a splint, or hanging the arm in a sling.

Other Treatments.—In the early stage of an inflammation, when the vessels are engorged, local bleeding and cold are valuable agents. Local blood-letting is done by cutting, leeching or cupping. Neither of these should be done except under the intelligent guidance of a physician.

Cold is highly valuable if used wisely; it is not to be used after the early stages, not to be too long continued or too intense; it should usually not be used with the very aged or very feeble.

Wet cold or dry cold may be employed. Wet cold is obtained by various fluids; ice water or water mixed with one-fourth the quantity of alcohol is good. One of the most common and best applications is lead water and laudanum. It is composed of one ounce of laudanum, one or two ounces of Goulard's extract, and one part water. A few layers of muslin or cheesecloth should be kept upon the part and should be frequently wet with the fluid.

Dry cold is generally safer, more easily applied, more comfortable. Cracked ice is put into a rubber ice-bag or bladder, or wrapped in a piece of flannel, and so applied, several folds of flannel first being placed over the part. The immediate application of an ice-bag to a sprained joint is excellent treatment. In all applications of cold the part must be carefully watched to guard against too great interference with the circulation.

Treatment in Later Stages.—Treatment in the later stages of an inflammation is directed toward promoting a reabsorption of the material which has been poured out, a clearing up of the wreckage. This is accomplished by compression, the application of astringents and sorbefacients, massage and heat.

Compression.—Compression is usually obtained by the firm application of a bandage. It should never be forcible, and if applied to a limb, should always include the distal extremity, *e. g.*, the elbow or wrist should not be firmly bandaged without including the hand and all the part below the affected area.

Astringents and Sorbefacients.—Lead water and laudanum, before mentioned, has an astringent effect. Tincture of iodine diluted with from one to three parts of alcohol, painted from time to time over an inflamed area, is often useful. Ichthyol ointment is very excellent in inflammatory swellings. It is rubbed well into the part or applied upon a cloth. It is best prepared by mixing one part of ichthyol with one to three parts of lanolin. Mercurial or blue ointment is used in much the same way as is ichthyol ointment.

Massage.—Massage is a systematic rubbing and manipulation after the acute symptoms have subsided. Motion and massage prevent stiffness, promote circulation and absorption, and bring tone and health to a part.

Heat.—Heat, either moist or dry, may do good and should generally be substituted for cold after a day or two. It then commonly gives greater comfort, relieving pain. Heat may be applied by fomentations, poultices, water bath or douche, and dry heat.

Fomentation.—Fomentation is the application to the skin of a piece of flannel wrung out of a hot liquid, usually water, as hot as can be borne. It is covered by a rubber-dam, oiled silk, or waxed paper; cotton should be placed outside the latter and the whole held in place by a bandage. A hot water bag placed over the bandage is useful.

Stupes.—The turpentine stupe is made as above by sprinkling upon the wet flannel from ten to twenty drops of turpentine.

Poultices.—A poultice is a soft mass applied to a part to bring heat and moisture to bear upon it. Poultices may be of flaxseed, arrowroot, starch, bread and milk, and so forth. A poultice should be applied in thickness of half an inch, should be covered with rubber-dam, waxed paper or oiled silk and over laid by a hot-water bag. It should be removed before it cools, another being ready to apply at once. Where suppuration is

threatened or exists time is often wasted and suffering prolonged by continued poulticing. This great blunder is common with the laity. In such a case, free opening by incision cannot be done too quickly.

Dry Heat.—Dry heat can be easily applied with the hot-water bag, a bag of hot sand or meal, a hot plate or bottle.

Counter-Irritation.—By counter-irritation we mean the use of some irritant upon a surface, thus attracting an increased quantity of blood and relieving thereby inflammation of a deeper structure. Blisters, mustard plasters, turpentine stupes, tincture of iodine, liniments, and so forth, are so used.

Constitutional Treatment.—General treatment may include general bleeding, circulatory sedatives, diaphoretics, diuretics, anodynes, antipyretics, stimulants and tonics. Hygienic measures are invariably demanded, cathartics are usually indicated.

Cathartics.—One of the first essentials in beginning inflammation, is free movement of the bowels. If this has not occurred spontaneously, one of several purgatives may be given. Calomel is often invaluable. It may be given in doses of one-tenth to one-fourth of a grain, repeated every hour until a grain or more is taken, or be given in one large dose of one to three grains. It may have to be followed by castor oil or epsom or rochelle salt. Either of the latter is sometimes excellent alone, a teaspoonful of each or of both being given every hour until a movement occurs. A bowel injection or enema composed of glycerine one ounce, epsom salt one ounce, and enough soapsuds to make a pint is often helpful.

Hygienic Measures.—These are of the utmost importance. Diet should be nutritious and easily digested. Milk is the ideal food. If peptonized it is more readily digested. Fermented milk known as koumiss, is excellent. Meat juice is highly nutritious. Meat broths are stimulating but do not contain a large quantity of nutriment. Soups strained and skimmed may be borne. As a patient grows better, he may take soft eggs, custard, junket, rice pudding, milk toast, boiled chops, oysters, and so forth.

The Sick Room.—The sick room should be bright and well ventilated. The temperature 68 degrees Fahrenheit. Bed clothing should be clean, the patient should be sponged daily for cleanliness and to keep the skin active. A little alcohol added to the water makes a grateful sponge bath.

Antipyretics.—Antipyretics are agents reducing temperature. If fever is excessive, it is best lowered by cooling drinks and the application

of cold to the surface. The latter is most usually accomplished by ice-bags, by cold sponging or cold pack.

Stimulants.—In low, long-continued inflammatory fever, some form of alcohol is most essential. It should, however, be given under the direction of a physician only.

ABSCESSES, BOILS.

Abscess.—An abscess is a newly formed circumscribed cavity containing pus. This new cavity is formed by the liquefying action of the bacteria upon the tissues.

Forms of Abscesses.—The general classes of abscesses are acute, following an inflammation, and that variously called chronic, cold, strumous or tubercular. The latter form is due to the bacillus of tuberculosis, and does not contain true pus.

Acute Abscess.—As soon as it is determined that an inflammation has gone to suppuration, free opening should be made. After free opening and evacuation, an abscess cavity should usually be irrigated by an antiseptic fluid. If free opening has been made, hydrogen peroxide is excellent for cleansing. This should be followed (unless abscess be of an internal organ) by corrosive sublimate solution (1 to 1,000 or 2,000). Drainage by tube or otherwise should be provided and hot moist antiseptic dressings applied. Rest promotes healing. This is obtained by bandages, splints, slings, and so forth.

Chronic Abscess.—The tubercular cold, scrofulous, or so-called chronic abscess, is a cavity produced by the action of the bacilli of tubercle. No true pus is present unless pus organisms have also gained entrance. A cold abscess lacks inflammatory signs. There may be no constitutional symptom unless true suppuration is added. The general health of the patient is, however, invariably below normal.

Treatment of cold abscesses is upon the general principles for the treatment of acute abscess, but should be trusted to none but a surgeon.

Felon or Whitlow.—This is a violent rapidly-spreading inflammation of a finger or toe, usually the former, due to pus germs. The symptoms are throbbing pain, great tenderness, swelling, a dusky redness. In case of a deep felon redness and pain may extend up the arm, and there is usually fever.

Treatment.—Rarely the application or iodine, cold, rest and elevation may afford relief. Generally, however, such treatment is worse than use-

less. Early free incision is very generally the only effective procedure. Incision, irrigation, antiseptic fomentations, and splinting, with elevation of the extremity, is the outline of treatment.

Boils or Furuncles.—This is the most common form of superficial abscess. If not surgically treated, a boil will finally rupture, pus will flow out, and a "core" of dead tissue at last be discharged. The treatment consists of early crucial incision, removal of dead tissue, irrigation with peroxide of hydrogen and corrosive sublimate, and the application of hot antiseptic fomentations.

Carbuncle.—This condition is a circumscribed infectious inflammation of the deeper layers of the true skin and subcutaneous tissues. It ends in a slough. A carbuncle has many points of suppuration. It often causes profound constitutional disturbance, and may prove fatal in the aged and enfeebled.

Treatment.—The best treatment is that of cutting out, under general anesthesia, the entire area infected. The large wound produced heals by granulation, or may later be skin-grafted. The wound is treated and dressed antiseptically. Secure rest and sleep with morphine, give nourishing diet and attend to the bowels and kidneys.

Ulcers.—An ulcer is a loss of substance (due to inflammation) of a superficial structure. It is commonly known as a "sore." The causes are various. Blows may knock off the skin. Burns may cause extensive ulceration. General diseases, such as tuberculosis or syphilis, may predispose to ulcers. Bed sores are common. Varicose ulcers of the leg, due to enlarged veins, are frequently met with.

Treatment.—Treatment consists essentially of removing the cause, so far as possible, and in treating the ulcer antiseptically. If a bed sore, remove the pressure; if syphilitic, internal medication is imperative; if a varicose ulcer of the leg, daily antiseptic cleansing should be practiced, and aseptic dressing should be applied. The most important factors, however, in assisting nature to relieve the engorged veins are rest, elevation, and firm, smooth bandage from the toes extending above the diseased area.

Gangrene or Mortification.—These denote the death of a part of the living body in mass. Putrefaction of the part occurs while it is attached to the living body. Gangrene results from a cessation of blood supply, or from obstruction of the outflow of blood from a part. Common among the causes producing such interference are a feeble heart and hard diseased

blood-vessels. Other causes are injuries, such as a crush, heat or cold, constitutional disease, such as diabetes.

The aged and enfeebled with hard vessels, should avoid injuries, even slight ones, of the feet. The mere cutting of a corn too closely may lead to gangrene. Such a person should attend carefully to the general health and should especially keep the feet warm and comfortable. The treatment of gangrene demands all the skill of a competent physician.

FRACTURED OR BROKEN BONES.

Kinds of Fracture.—Fractures are classified as of two kinds, the simple and the compound. A simple fracture is one in which the skin is not injured, so that no matter how much the bone is broken up, there is no communication of the fragments with the external air. A compound fracture is one in which the breaking of the bone is accompanied by a wound, caused either by the same force which produced the break, as, for instance, a bullet, or by the ends of the broken bones protruding through the skin. For example, a man may fall from a tree, breaking the femur or large bone of his thigh, and the broken end of the bone may be driven through the skin and into the ground. Compound fractures are much more dangerous than simple ones, chiefly because whenever the skin is broken there gain entrance to the tissues disease-producing germs, which set up the process of suppuration.

Treatment.—Compound fractures are also more likely to be serious because the skin and muscles are much bruised. When, however, the wound which communicates with the fracture and makes it compound is small, an effort should be made to gain the advantages of a simple fracture by covering the opening in the skin with a clean cloth wrung out of corrosive sublimate solution (1 to 2,000) or wet with salt solution (one teaspoonful to the pint) until the surgeon arrives and takes charge of the case. This imperfect effort at antiseptic treatment must often fail, from the impossibility of applying it quickly enough, but it ought always to be tried.

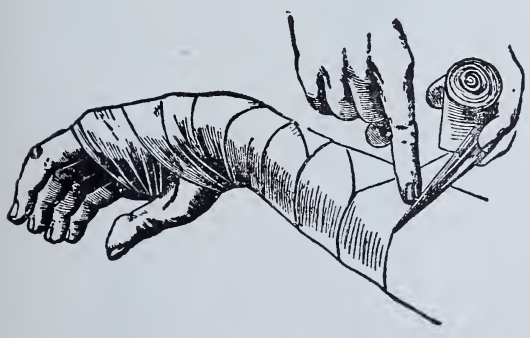
Recognizing Fractures.—We may recognize the fact that a bone is broken by the following indications: first, that the limb is shortened or bent where there is no joint; second, by there being an unnatural degree of movement at the seat of injury; third, by the violent pain which attends a fracture; fourth, by the grating which may be felt, and sometimes even heard, when the limb is moved.

Setting of Broken Bones.—This consists merely in pulling and pressing the fractured extremities of the bone into their proper position. Such an operation, of course, requires a full knowledge of the anatomy of the parts and should, as a rule, be left for a skillful medical attendant, if he can be procured, within twelve hours. In the meantime the wounded part should be placed in the most comfortable, or rather the least painful, posture, wrapped in cloths wet with laudanum, or lead-water and laudanum, and kept cold with ice, in order to prevent swelling and diminish the suffering as far as possible.

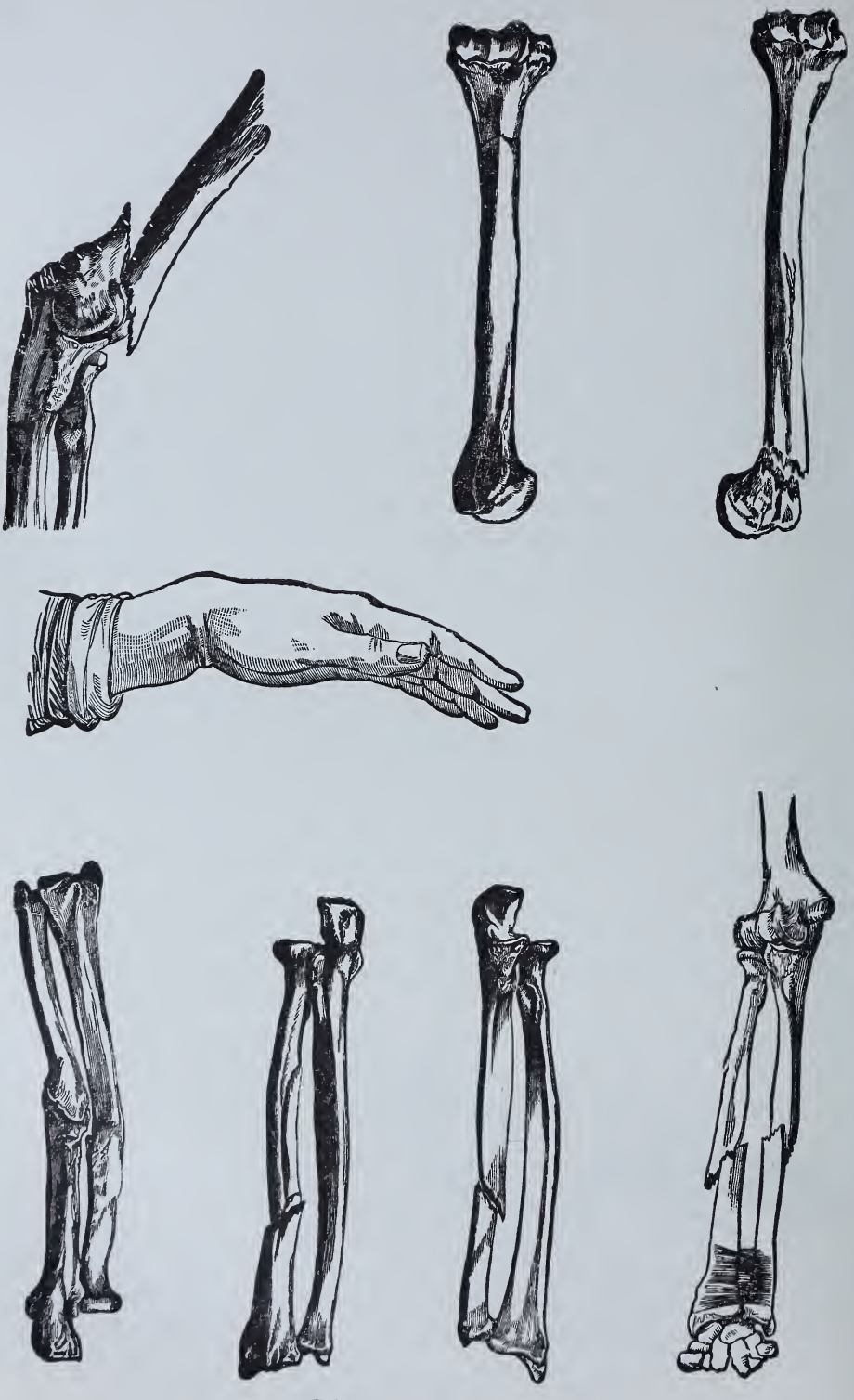
Keeping a Broken Bone in Place.—When the physician succeeds in replacing the fragments, his next object is to secure them from being again deranged. This is usually accomplished by the aid of splints of various kinds, such as are shown applied to the arm on the following page. These splints may be made of wood, tin, pasteboard, or gutta percha, and are kept in place themselves by bandages or knotted handkerchiefs. In certain cases, material, such as plaster of Paris or starch, which stiffens after it is applied to the limb, upon a bandage, can be employed with great advantage.

Injuries Far from Home.—When a person is injured far from any habitation, and must be moved a considerable distance, if it is found that a bone has been broken, the first thing to do is to apply to the fractured limb a temporary splint. This will prevent the injury from becoming compound, if it is as yet only a simple fracture, and will save the wound from being irritated, if the injury is already a compound one.

Bandaging.—For the making of bandages and the various kinds see succeeding chapter. The operation of bandaging requires some practical experience before it can be performed neatly. The idea, however, of the method of procedure, winding the cloth smoothly around the arm, for instance, in a spiral direction, can be gathered from the illustration. Where the limb is conical, increasing in size from below upward, the only way to cause the bandage to lie evenly and be of much use is to make what are technically called reverses, turning the roll of linen over each time as it comes on top, as is



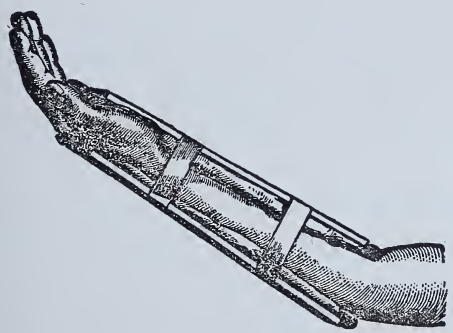
Application of a Bandage.



BONE FRACTURES

represented in the wood-cut. The artist, however, has delineated the surgeon's fingers as being those of a left-handed man, a variety of the human species which, strange to say, is tenfold more numerous in pictures than in real life. The best substitutes for bandages available at a distance from human habitation are often to be found in handkerchiefs.

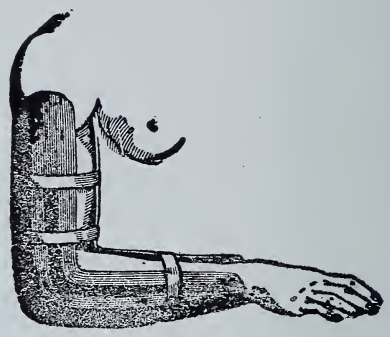
Splints.—To obtain splints for the temporary support of fractures, the most varied articles have been pressed into service. Thin, light boards, like shingles or the sides of a cigar-box, which can be cut into any form desired, are often the best, but any object which may be trimmed or bent to suit the exigencies of the case, and is stiff enough to retain the form given to it, can be utilized. After preparing the splint it should be padded, for which purpose cotton-batting, tow, old rags, dried leaves, or hay may serve, these materials being bandaged fast to it on the side which is to come in contact with the injured member. The apparatus is then applied to the limb, an arm, for example, as shown in the figure below, and after carefully adjusting the injured member to the least painful position, as well as to that which is nearest its own natural shape, the splint or splints are fastened in place with several turns of the bandage applied as previously suggested. The adjoining wood-cut shows the method of applying the splints for a fracture of both bones of the forearm. After arranging the arm and splints as depicted, the whole should be covered in with a bandage, and suspended by a sling from the neck in such a way as to be carried by the patient across his chest.



Treatment of Fracture of Both Bones of the Forearm.

Fracture of Arm.—Fracture of the humerus or arm-bone between the shoulder and elbow should have applied curved splints made of thick pasteboard, wet in boiling water and moulded to the shape, sheet gutta percha similarly softened, or tin, one on the inside and another on the outside, as represented in the figure. The fragments of the bone are to be adjusted in proper position, a bandage applied, and then the splints fitted and firmly yet not too tightly bound on with a bandage running from the tips of the fingers to the shoulder. If the roller is applied above only, the hand and fingers will swell up in consequence of the pressure, interfering very

seriously with the circulation of the blood. In fractures of the arm it is always advisable to arrange the elbow bent at a right angle, because should the arm be left stiff, as may happen, perhaps with the best treatment, it is much more useful than when straight.



Fracture of the Humerus.

Fracture of Legs.—In fractures of the legs, a contrary rule holds good, and the effort should always be to keep the broken limb as straight as possible.

An excellent temporary dressing for a fracture of the leg below the knee is well indicated in the figure. The injured limb should be drawn out to as nearly its full length as can be borne, measuring it by the sound side to determine this, and then the fragments of the bone pressed, if possible, to their proper places. The pillow which has previously been laid beneath the injured member is then doubled up, as shown in the cut, and fastened with three or four strips of bandage or with handkerchiefs. If the leg is much bruised, or the pain very severe, a soft linen cloth soaked in laudanum, or strong lead-water and laudanum, should be wrapped around it before being bound up in the pillow.

Dislocations.—Continued displacement of the bones comprising a joint, after the ligaments have been more or less torn, constitutes a dislocation, or, as it is popularly described, "out of joint." These injuries are generally the result of external violence, such as falls, blows, twists, and so forth, which have caused the limbs to move in a direction, or to an extent, for which nature had not adapted them. A familiar example of a dislocation is that of the lower jaw, and the position of the bones composing this important articulation in their disturbed or displaced condition is well shown in the marginal illustration.

Dressing for Broken Leg.

Symptoms of Dislocation.—In a general way, a dislocation is recog-

nized, first, by the altered appearance of the joint, which is usually very apparent when compared with the corresponding joint on the opposite side; second, by the movements of the affected joint being lessened; third, by the fact that efforts to move the joint cause much pain; fourth, dislocation can usually be distinguished from fracture, which, when near a joint, is apt to give rise to all these symptoms, by the absence of crepitus, as the grating noise produced by rubbing together the ends of the fragments is called. This sign, however, would, of course, prove falacious and misleading if both a fracture and a dislocation existed.

Dislocation of Lower Jaw.

Treatment.—The obvious treatment for a dislocation is reduction, or a replacing of the bones forming the joint again in their proper relations. In reducing a dislocation, not only should the operator have all his anatomy at his fingers' ends, but a vast amount of practical experience is often necessary to decide whether a dislocation is complicated with a fracture, or whether a dislocation or a fracture is the injury to be treated.

So great and so permanent is the injury likely to result from the blunders of attempting to "reduce" a fracture, erroneously supposing it to be a dislocation, or *vice versa,* that no time should be lost by the sufferer in availing himself of the best medical services procurable.

Foreign Bodies in the Throat.—Foreign bodies in the throat are sometimes substances imprudently swallowed by mistake, such as fish bones, pins, and so forth, or coins, marbles, and other playthings half ignorantly introduced by children. If the breathing is not seriously interfered with, medical assistance, sent for at once, should be awaited, as peculiar forceps and other instruments will probably be necessary to extract the intruders. If choking to death seems imminent from pressure on the windpipe, thumping on the back, holding the patient up by the heels, and striving to hook out or push the foreign body, if it is not intrinsically dangerous, down into the stomach, may be tried. At the last gasp the operation of tracheotomy, or opening the windpipe, should be performed by any one who has the knowledge and the courage to attempt it.

Rupture or Hernia.—By the above is commonly meant the protrusion of some organ of the abdomen through the walls of the latter. The most common contents of hernia are bowel or omentum. The commonest sites are at the navel and the groin.

The fact that persons so affected are often induced to entrust themselves to the treatment of quacks or charlatans is deplorable. Serious results often occur. There are only two forms of proper treatment, namely, either the wearing of a truss fitted and adjusted by a skilled person or submission to surgical treatment at the hands of a reputable surgeon for the radical cure of the condition.

PART XV OF BOOK IV

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CURATIVE MEDICINE

PART XV.

ANESTHETICS AND SOPORIFICS.

Discovery of Anesthetics.—The victories of peace often far surpass in result the renown which they receive. Such was the achievement of Thomas G. Morton, a dentist, who, October 16th, 1846, for the first time produced complete anesthesia or insensibility to pain under a major surgical operation. This occurred in the clinic of the celebrated surgeon, Dr. John C. Warren, at the Massachusetts General Hospital. These men, by their discovery, not only wrought a revolution in surgery, but were victors over the horrible agony previously suffered at the hands of the surgeon. Their labors have brought to pass what Dr. Oliver Wendell Holmes has written: "The fierce extremity of suffering has been steeped in the waters of forgetfulness, and the deepest furrow in the knotted brow of agony has been smoothed forever."

Spread of the Discovery.—News of this remarkable discovery seemed to be carried by the winds, and soon anesthesia was used in the clinics of the world. The following year, chloroform was introduced by Sir James Simpson, of Edinborough. Such a boon to humanity is beyond estimation. The agony suffered under a severe surgical operation only the few courageous ones enduring it and yet surviving can tell. Anesthesia now renders comparatively easy very many new procedures, especially those requiring the greatest delicacy of touch and accuracy in dissection of brain or amid vessels and nerves—procedures not possible in the haste necessary before the days of anesthesia. Then, too, the operations were formerly few; now relief is for the many. The numbers rapidly multiplied, many fold. For example, in the Massachusetts General Hospital during five years previous to the introduction of anesthesia, only 184 persons were willing to submit themselves to the ordeal of an operation.

In the five years following, 487 operations were done, and, in 1899, in the same hospital, 3700 operations were performed. Anesthesia is a benign alleviator of suffering, a merciful prolonger and saver of life.

ANESTHETICS.

Anesthetics, artificial means of producing insensibility or loss of feeling, are general and local.

General Anesthetics.—The more common ones are ether, chloroform, nitrous oxide, and ethyl bromid. They are given by inhalation, and commonly more or less mixed with air or oxygen. The chief uses of general anesthesia are, to abolish the pain of labor and surgical procedures; to produce muscular relaxation in ruptures, fractures and dislocations; and to enable the physician to make examinations otherwise painful.

Preparation of Patient.—In emergencies, a patient sometimes must needs be given an anesthetic without previous preparation, but, when time affords, preparation should never be omitted. The dangers from an anesthetic are commonly magnified by the laity, yet a skilled anesthetizer, while not afraid, should have a wholesome respect for the complications which are always possible to arise. The better condition a patient is in at the time of giving an anesthetic, so much the less likely are serious results. Therefore the advisability of attention to the patient and his preparation previous to operation. The condition of lungs, heart, and kidneys is especially to be noted, the urine examined for albumen, casts and sugar. While the presence of the latter do not absolutely contraindicate the giving of an anesthetic, yet they may at least influence in the selection of the kind, and lead to special necessary precaution in its giving.

The Bowels.—The bowels should be freely emptied the day before or the morning of operation. This is well done by epsom or rochelle salts, one to two tablespoonfuls, supplemented, if need be, by an enema of soap-suds one quart, glycerin two tablespoonfuls, epsom salts two tablespoonfuls. The injection should be given a few hours before operation. The bladder should also be emptied immediately before operation.

Rest and Sleep.—The patient should rest for twenty-four hours previous, preferably in bed. He should have a general bath, that the skin may be active. Sleep should be secured the night previous; if there is nervousness, a warm bath at night may quiet, or it may be necessary to give a powder of potassium bromide, ten grains, or of trional, ten grains,

in a little hot broth or hot tea; either may be repeated. The anxiety of the patient may interfere with digestion. At any rate, the diet for a day previous should be light, for example, broths, soups, soft eggs, bread and butter, toast. At the time of giving an anesthetic the stomach should be empty. If operation is to be early in the morning, no breakfast should be given. A small quantity of beef tea or of broth and a little brandy may be well. If the operation is not until midday, a light breakfast of beef tea or of broth and toast or a roll had best be taken. Never give any food within three hours of operation, and only a very moderate quantity of water within the same time. Matter in the stomach induces vomiting, and this endangers the patient to the entrance of portions of food into the windpipe.

Temperature of Room.—The room should be warm, not less than 70 degrees Fahrenheit, and the patient protected with sufficient blankets. If a light in the room in necessary, it should be above and some little distance from the patient. Ether is inflammable, and the vapor explosive, but the latter sinks to the floor. The clothing should be loose, particularly about the neck and body. If a woman, the corset should of course be removed to give opportunity, if only this once, for free breathing. The hair should be braided. A third party should always be present. The patient should lie upon the back with only a small pillow beneath the head. Take care that the limbs are not cramped or pressed upon. The lips and nose should be anointed with vaseline. Having spoken some cheerful, encouraging word to the patient, the anesthetizer examines the heart, notes the condition of the pulse and respiration, and, without fail, sees that any foreign bodies in the mouth, including false teeth, are removed. He is now ready for the administration of the anesthetic.

Giving Ether.—The writer desires to state, in most emphatic terms, that an anesthetic should never be given by any but a skilled person or under the direction of such a person—one who can interpret danger signals, and can act promptly and intelligently. The limits of this work forbid giving detailed directions. Some of the salient points regarding the giving of ether may prove of benefit as well as of interest.

What the Operator Will Have at Hand.—The anesthetizer will have at hand stimulants—brandy, strychnine, atropine, digitalis and a hypodermic syringe in working order. He will have a mouth-gag and tongue forceps, and needs at hand two or three small towels. Ether is best given upon some simple inhaler, such as an Allis, but may be well given upon a towel folded into a cone, or, if the face be anointed, the folded towel may

be placed flat over the patient's nose and mouth. Having gained the confidence of the patient, by assurances that he will give the anesthetic slow and will not choke him, the anesthetist says, "I want you to breathe through the inhaler a few moments to get used to it before I put any ether upon it. Now just a drop or two." So beginning, and continuing very slowly, "feeling" his way, the anesthetist may have reasonable hope that he will avoid any serious trouble in the stage of excitement. If choking or coughing occurs at first, proceed very gradually, giving a breath or two of pure air, and the throat will soon become accustomed to the drug which at first irritates. Vomiting thus early demands the withdrawal of the drugs for a few moments, until the throat and mouth are freed from the vomitus.

Pushing the Anesthetic.—After primary irritation ceases, the anesthetic may be "pushed," more and more being added, until, when the patient is in the second semi-conscious excitable stage, he may be getting a large quantity. "Pushing" the drug at this point will quickly send the patient over the period of disturbance into the quiet of complete anesthesia. If, however, very violent struggling with ridigity and great cyanosis, or blueness occurs at this time, it is generally wise partially to withhold the anesthetic for a few moments.

Signs of Perfect Anesthetization.—A patient is known to be completely anesthetized by the loss of consciousness, loss of motion, relaxation of the muscles, loss of certain movements, *e. g.*, that of winking when the eyeball is gently touched. The breathing should be regular and quiet. The anesthetizer not only observes the movements of the chest in respiration, but notes by touch and sound the rhythmical inflow and outflow of air. The breathing and circulation are especial indexes as to the condition of the patient. The regularity, rate, and strength of the pulse should be frequently noted. Any marked variation from the normal should receive immediate attention. Stimulation may be needed or withdrawal of the anesthetic demanded. The color of the patient is also a valuable index. Great pallor generally indicates failure in the circulation; cyanosis or blueness, that the inhalation of oxygen is insufficient. The latter generally calls for removal of the drug and a determination and correction at once of the cause of imperfect inspiration.

Complications.—Irritation apt to arise early in the administration has been alluded to. If vomiting occurs, the head is always to be turned to one side and the mouth wiped out. In a large majority of cases vomiting may be stopped by increasing the quantity of the anesthetic.

The Respiration.—Before complete anesthesia occurs the patient may "forget" to breathe; the word "breathe" spoken loudly into his ear will generally arouse him to efforts of respiration. If after complete anesthesia the respiration is abnormal, the immediate determination of the cause and its correction are imperative. A muscular movement at such time will generally indicate recovery from the anesthesia and the necessity for an increased quantity of the drug. Otherwise, the anesthetic should be stopped, the mouth gagged open, the tongue pulled forward with forceps or towel, and mucus collected in the throat wiped out. This will generally be sufficient to restore breathing and to relieve the cyanosis, allowing the administration soon to be resumed. Should these means fail, artificial respiration should be instituted (which see below). The foot of the bed should be raised, fresh air admitted to the room, the patient well protected and surrounded by hot-water bottles. Meanwhile, various means of stimulation should also be used—hypodermic injections of strychnine, atropine, digitalis, ammonia; injections into the bowel of hot black coffee and brandy; a mustard plaster applied over the heart.

Artificial Respiration.—Laborde's Method. The jaws are held apart and the mucus wiped from the mouth and throat. The tongue is grasped with forceps or the fingers covered with a towel, and is drawn every four seconds, strongly and quickly forward, and each time allowed to go gradually back.

Sylvester's Method.—The former method should be used in conjunction with this. The patient is in a recumbent posture. The operator grasps both the patient's arms near the elbow and draws them gradually outward and upward until they nearly touch the patient's head. They are thus held for two seconds, while air enters the lungs. The arms are then gradually lowered and pressed firmly against the side and front of the chest for two seconds, thus forcing air out of the lungs. The movement of elevation and depression should be made not more than fifteen or eighteen times a minute.

Giving Chloroform.—Ether is a safer anesthetic for most purposes than chloroform. The latter is preferable, however, in a few conditions, *e. g.*, in infants and the very old; in serious lung and kidney trouble chloroform, because of the less quantity required, is less irritating. In certain operations about the face the patient can better be kept anesthetized by chloroform, and it is often better suited for employment in labor, because more quick in action and more relaxing.

Giving Ether.—The general principles for giving ether apply to the

giving of chloroform. However, because chloroform is quicker in action, it should be given with greater care. Ether, like alcohol, is a stimulant to the heart, and is therefore generally preferred in heart disease. Chloroform has clinically a distinct depressant action upon that organ.

How to Give Chloroform.—Chloroform may be well given upon a folded towel or napkin, or piece of cheese-cloth. The object from which the chloroform is inhaled must not be held in contact with the face but an inch or more above the nose so that the vapor may be freely mingled with air. Chloroform should be given drop by drop, cautiously, and particular watch-care given for danger signals. If struggling occurs it is imperative that the drug be not "pushed" lest, at this time, when breathing deeply, the patient inhales at a few breaths an overwhelming quantity. Eternal vigilance is the price of safety in anesthesia and especially so in the giving of chloroform.

Nitrous Oxide.—Nitrous oxide or laughing gas is perhaps the safest general anesthetic. Its action is rapid, anesthesia resulting in one minute. But its effect is fleeting, lasting less than one minute, thus rendering it unfit for major operations. It is much used by dentists for the extraction of teeth and has been used with advantage in minor surgery, such as opening an abscess. The gas (a liquid under pressure in steel cylinders) is bulky and not readily carried by the surgeon; the apparatus necessary for its use together with other agents is complicated, so that this drug is not likely to become popular in surgery.

Ethyl Bromide.—This, a colorless agreeable liquid, has not been widely used. In giving it to an adult it is well to pour from four to six teaspoonfuls, the whole amount to be given, upon a folded towel, and to apply the saturated surface directly to the nose of the patient, pressing the edges of the towel down upon the face to exclude the air. Unconsciousness is obtained in about half a minute. The anesthesia is rapidly recovered from, and after ill-effects are almost nil. This agent is adapted to cases needing anesthesia for examination, to the incision of abscesses, and for the relief of suffering in labor. It is considered comparatively safe by those who have used it. The favorite general anesthetics have been referred to.

Care of Patient After Anesthesia.—The patient must be carefully watched until he regains complete consciousness. He should, of course, remain recumbent. The erect attitude might result in heart failure. The head should be higher than the body. He should be warmly covered and perhaps be surrounded by hot-water bottles. The inhalation of oxygen is

best, but an inhalation of vinegar is an excellent procedure to prevent nausea and vomiting. If the latter occurs, the head should be turned well to one side, the vomitus caught in a towel or basin. Food should not be given for several hours and if water is allowed it should be given only in teaspoonful doses quite hot, frequently repeated. If vomiting continues a mustard plaster should be put over the stomach, fresh air admitted to the room and a little hot black coffee given.

Local Anesthetics.—The chief ones are ethyl chloride, ether and rhigolene sprays, ice and salt, carbolic acid, eucaine and cocaine.

Freezing Agents.—These agencies are employed in the lesser operations, and occasionally when there is some complication preventing a general anesthetic.

Ice and Salt.—If one-quarter pound of ice be broken into small bits, and one-eighth pound of common salt added and the mixture be put in a thin bag and laid upon the skin surface, the area will become anesthetic in ten or fifteen minutes.

Ether, Rhigolene and Ethyl Chloride directed upon a part in a fine spray produce anesthesia by their cold effect. The latter is put up in a convenient glass tube with a metal cap. A part touched with pure carbolic acid becomes blanched and anesthetic.

Cocaine Hydrochlorate in a watery solution is quite commonly used for injecting into the skin, for applying to the mucous membrane, the latter absorbing it. It is applied to the nose, mouth or throat by a spray or swab, or dropped into the eye. For injection a two per cent. solution is generally sufficient. For application to the eye a four per cent. solution may be necessary, and for the nose and throat a ten or even twenty per cent. solution may be cautiously used. Da Costa says that never more than two-thirds of a grain should be painted upon a mucous surface and never more than one-third of a grain should be injected into the tissues. Examples of useful purposes to which cocaine may be put are, for instance, the removal of a wen, or a wart, the correction of a small deformity of the bones of the nasal cavity. A finger or toe can be comfortably amputated by its use, a constricting band meanwhile being placed about the root of the part to prevent the absorption of too great a quantity of the drug. The whole area supplied by a large nerve may be anesthetized by injecting cocaine about the nerve trunk.

Eucaine Hydrochlorate.—Eucaine hydrochlorate has practically the same action and may be used in the same way as cocaine.

Infiltration Anesthesia.—Infiltration anesthesia, commonly called

Schleich's method, is produced by injecting into a part several ounces of a weak table salt solution to which a minute quantity of cocaine, morphine and carbolic acid has been added. The method is very efficient and has been successfully used for major operations. The anesthesia is partly due to the pressure upon the tissues, especially the nerves, by the injected fluid.

Spinal Anesthesia.—A method lately much talked about and one practiced considerably in France, is one in which a small quantity of a one-half or one per cent. solution of cocaine is injected by a syringe through a hollow needle into the spinal canal. In about five minutes loss of sensibility occurs in the parts supplied by nerves given off below the point of injection. All of the body below the diaphragm can thus be rendered anesthetic. Anesthesia lasts about forty-five minutes. It has been employed successfully in labor and in various grave operations. But it is not without its dangers, and, though relieving pain, it does not remove the horrors of an operation which consciousness must give. This method will probably never supplant general anesthesia. The ideal anesthetic is one without danger which abolishes both consciousness and sensation, thus giving the surgeon the absolute control of his patient—a condition essential to the accomplishment of the best result. May the twentieth century see the discovery of the ideal anesthetic.

SOPORIFICS OR HYPNOTICS.

The Sleep Producers.—The class of remedies so-called are sleep producers. They may be divided into those which not only cause sleep but also relieve pain and those which have no pain-relieving properties. Of the former opium is the best example, and should be given where sleeplessness is due to pain, whereas, if due to other causes opium should never be given.

Insomnia.—Insomnia is such a distressing experience that people will go to extremities to relieve it, sometimes being led to use carelessly the most powerful and harmful remedies. The warning cannot be too emphatic to the laity against such a practice, for this class of drugs should rarely be taken except by the advice and under the direction of a skilled physician. The physician himself should be keenly alive to the especial danger of most direful drug habits. For the treatment of insomnia diligent search should be made for the cause and the latter removed. If due to coffee-drinking at night the habit should be abandoned. If to nervous-

ness because of overwork or excessive social duties proper rest from such strain will probably relieve. If weariness or exhaustion be the cause, moderate stimulation with some hot drink, a little coffee or a small quantity of brandy, will help. A warm bath before retiring is sometimes efficacious. Some occupation before retiring, *e. g.,* the perusal of some light but interesting book will often suffice.

Insomnia from Pain.—However, insomnia from pain must be relieved by opium or some of its derivatives, codeine, morphine or heroine. Long continued administration of opium, except in hopelessly incurable cases, is to be strongly condemned. The cause of pain should be removed, then the need of a hypnotic is gone. In emergency, for the relief of severe pain, there need be no hesitancy in giving to an adult one-fourth to three-fourths of a grain of opium, one-sixth of a grain of morphine, or ten drops of the tincture of opium (laudanum), repeating either dose in an hour if relief is not obtained. Meanwhile a physician should be summoned. When opium is given, it should be with the clear understanding of the probable ill-effects of mental depression, and of nausea and vomiting, and the danger of the habit ever in mind.

Chloral.—Chloral is perhaps the purest soporific. It is poisonous, however, when taken in excessive dosage, causing weakness of the heart or even heart failure. When insomnia is due to nervousness Hare recommends the following:

Chloral	1 or 2 drachms
Bromide of potassium	2 drachms
Syrup of wild cherry	1 ounce
Water sufficient to make	3 fluid ounces

Mix. Directions: Take a dessertspoonful in water at night.

Sulphonal.—Sulphonal has sleep producing powers perhaps not equal to those of chloral. It finds its chief usefulness in nervous insomnia and especially in that occurring with those of unsound mind. It is commonly given in powder, ten grains to a dose. As it is insoluble in cold water it should be given in hot water or hot milk. The drug is slow in effect and therefore should be taken two or three hours before retiring.

Trional and Tetronal.—These are closely related to sulphonal and are almost identical with that drug in their action. Their effect is felt in thirty minutes or less. The dose of each is ten to fifteen grains agreeably given in hot broth or tea.

The Bromides.—The bromides of potassium, of sodium or of ammo-

nium, the three being practically identical in action, are drugs very commonly used as quieters and sleep producers. The former is most frequently used. It is indicated where there is undue excitement of the nervous system, but never where the nervous symptoms are due to depression. It is a useful remedy for hysterical women, for the disagreeable nervous symptoms often accompanying the climacteric, and is a soporific for the over-worked and nervous, provided it is not long continued. It is useful in neuralgias and nervous headaches and frequently quiets the excessive nervousness of drunkenness. The dose of either is ten to thirty grains taken dissolved in water.

PART I OF BOOK V

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Book V

ACCIDENTS AND EMERGENCIES

PART I.

FIRST AID TO THE INJURED.

The fate of an injured person frequently depends largely upon the acts of the one into whose hands he first falls. If proper immediate assistance be given, serious consequences may be avoided. Everyone is liable to be called upon at some time to administer first aid, and therefore, it is a duty with all to be so prepared that whatever and whenever the emergency, further harm may at the time be prevented, suffering relieved and perhaps life saved by quick and proper action.

In this present chapter, in conjunction with that on poisons and their antidotes and that on the diagnosing of disease by symptoms (see general index at back of book), will be found a fund of information so arranged as to be especially available for quick reference in times of accident and emergency. It will also be found of great advantage if the chapter on Anatomy and Physiology (see Index) has been previously studied, as it will give a knowledge of the body that may prove invaluable in case of accident.

In cases of severe injury no time should be lost in sending for a physician, and it is to be borne in mind that it sometimes happens that an injury which to the non-professional seems trivial, may be recognized by the physician as extremely grave. But until the physician arrives there is need of doing many things which anyone can do, and the immediate doing of which often is the necessary preliminary in the saving of life, such as putting out burning clothing, stopping bleeding, rescuing people from drowning, extricating them from machinery, removing them from contact with electric wires, etc., and then attending to the immediate relief of their sufferings. Then, too, it frequently happens that no professional

aid can be obtained, and the care of the injured and the ill devolves upon those who happen to be at hand.

Whether physician is expected or not, make the sufferer comfortable to start with, by laying him down gently, straightening his limbs, raising or lowering his head and such like things, as the case may require. If the injured part is covered with clothing, remove it by cutting or carefully tearing, but do not remove more clothing than necessary, as one of the results of injury is to make the injured person feel cold. Shoes or boots should be cut away in severe injuries about the feet. Do not try to do too much. Do nothing for the sake of doing something. Yet, remember, that the right thing done at the right time relieves suffering and may save life. The great thing is to know the right thing to do and when to do it. Be cool. Act quickly but not hurriedly. Make everything you do count for something in relief.

The following advice as to what to do in certain specific cases should be known by everyone and is here arranged in alphabetical order for ready reference.

ALPHABETICAL REFERENCE LIST WITH EXPLANATIONS AND TREATMENTS.

Acid Burns.—See Burns.

Asphyxia or Suffocation.—Proceed to restore breathing by artificial respiration, as in drowning. See Rescue from Drowning and Gas Poisoning.

Arms, Broken.—See Fractures.

Arterial Hemorrhage.—See Hemorrhage.

Artificial Respiration.—See treatment in Rescue from Drowning.

Apoplexy.—This state is caused by the rupture of a blood vessel within the skull and consequent escape of blood and pressure on the brain, or by the clogging of a blood vessel, thus cutting off the blood supply to some part of the brain. The result is the same in either case: a part of the brain ceases to perform its functions owing to pressure of the clot. If the clot be small the effect will be slight; if it be large the effect will be grave if not fatal. The sufferer loses consciousness, sometimes falling as if felled by a heavy blow, sometimes becoming insensible more slowly. In well-marked cases, no effort will arouse the patient from insensibility. The face is flushed and the pupils of the eyes generally dilated, or one may be dilated and one contracted. Breathing is slow and labored; snor-

ing may occur; cheeks are often puffed out with each respiration, the air being blown through the lips. Pulse is slow, full and hard. Paralysis is an important symptom and must be looked for. Paralysis generally is only on one side—the face, arm and leg on the same side being commonly affected. The mouth is usually drawn away from the affected side of the face.

Treatment.—Lay patient down, head and shoulders slightly raised; loosen clothing about neck and body; wrap cracked ice in a towel and place it on the head, or wrap head in cold wet cloths and keep them cold until arrival of the doctor. If without medical advice for long period, empty the bowels by giving an injection of soap and warm water, at the same time giving a cathartic, castor oil or salts, if the patient can swallow. Keep the patient quiet. *Do not give any stimulant.*

Bandaging.—See special article on bandaging.

Bleeding of all Kinds.—See Hemorrhage.

Brain, Concussion of.—See Concussion of the Brain.

Brain, Compression of.—See Compression of Brain.

Bites of Dogs.—Dog bites may be of trifling import or of serious consequence. Usually the fright they cause is unwarranted. If the dog is not diseased all that is requisite is such treatment as would be given any lacerated wound. In view, however, of possible seriousness it is well in all cases to immediately consult a physician, and if there is the slightest suspicion that the dog has rabies or is "mad" or even if it is sick in any way, this should be done at any cost or trouble, and if for the moment impossible, then in the meantime, the wound should be cauterized at once. If there is evidence that the dog had rabies the Pasteur treatment should be taken without delay. If commenced within a few days after the bite (the sooner the better), the Pasteur treatment is an almost certain preventive of the development of hydrophobia. Other animals as well as dogs suffer with rabies and may communicate it to human beings. (See general index at back of book for special article on Hydrophobia.)

Bites of Venomous Insects, Snakes and other Reptiles.—In all such bites the prime object is to prevent the spreading of the poison through the system, and after that to get it out of the wound. Bind a stout cord, string or anything at hand very tightly around the limb, a few inches above the wound, remembering, however, that there is danger in making it too tight and also in keeping it tight too long. Then suck out the poison—it is harmless in the mouth. If physician near at hand, hasten to him; if one cannot be secured without delay, the poison may be removed

or neutralized by prompt incision and application of some caustic. Dip a bit of soft stick in strong carbolic acid and rub every part of the inside of the wound with it, or with any caustic at hand. If a caustic cannot be obtained, heat a piece of iron or steel to white heat and thrust the white-heat end into the wound. A knitting needle or small knife blade will answer the purpose. After cauterization, treat as an infected wound. This done relax the cord or ligature above the wound and again tighten it and watch for a few minutes for symptoms of general poisoning. Repeat this until sure that the patient is out of danger. If symptoms of general poisoning do come on similar to those of shock, keep the ligature tight and treat the patient as for *Shock,* giving whiskey or other alcoholic liquors in sufficient quantity to sustain the system; but there is no advantage in absolute intoxication.

MAD DOG OR POISONOUS REPTILE BITES.

What to Do.—This class of common and dangerous emergencies may be successfully met on the moment by the simple means shown in the adjoining plate. By preventing the poison from entering the system, time is gained for the use of the proper remedies.

The Band.—The band, fillet or ligature used may be a strap, cord, rope or handkerchief—anything, in fact, which can be drawn and tied tightly; or which, if tied loosely, will permit of a stick being placed within it, and a tight twisting of the same, after the manner of a *tourniquet,* in order to stop the blood circulation more effectively.

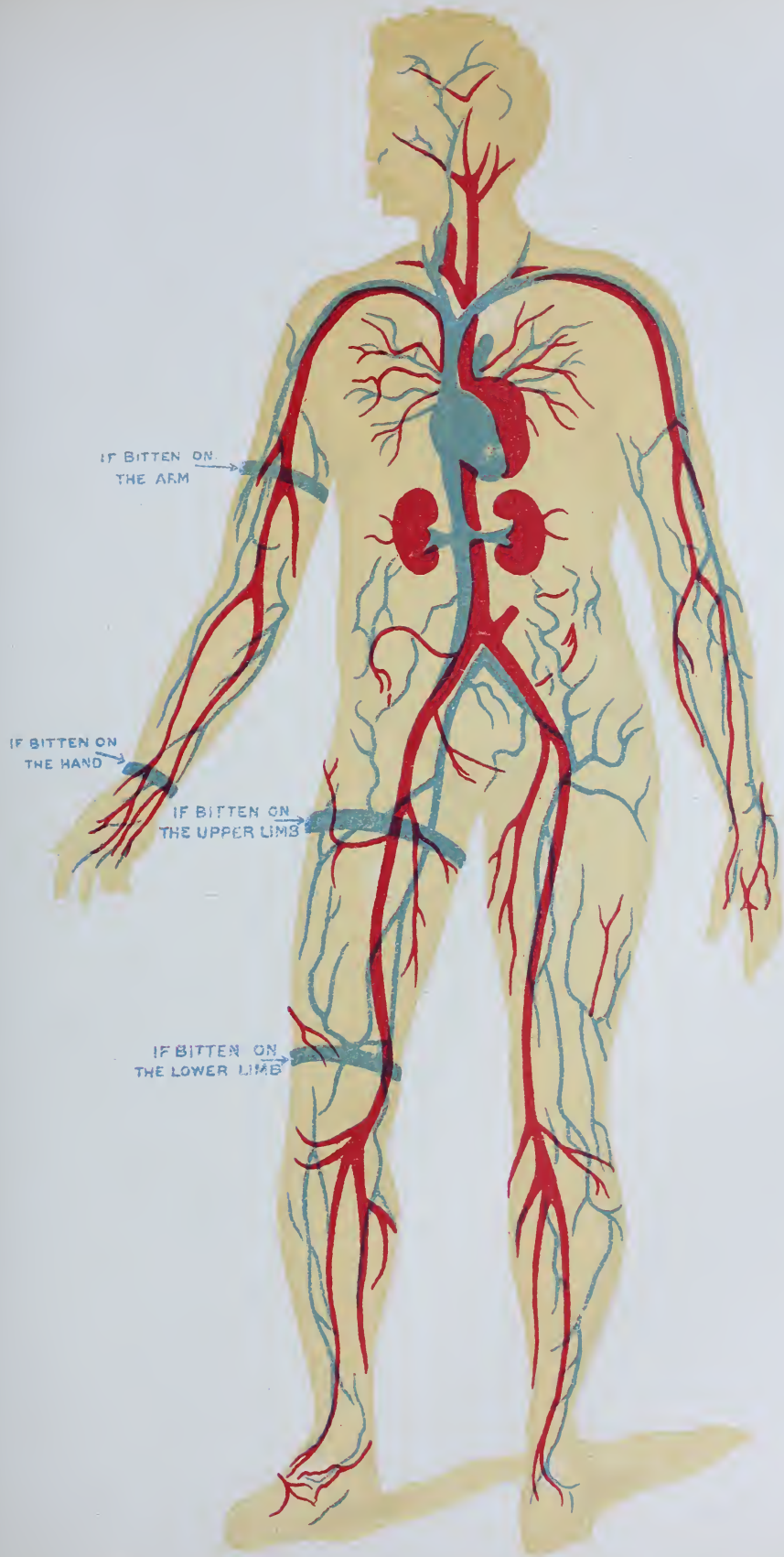
How to Do.—1. If the bite be on the arm, bind the cord, or ligature, tightly around the limb at the point indicated by the head of the *"arm"* arrow.

2. If the bite be on the hand, bind the cord tightly around the wrist at the point indicated by the head of the *"hand"* arrow.

3. If the bite be on the upper part of the leg, bind the cord tightly around the limb at the point indicated by the head of the *"upper limb"* arrow.

4. If the bite be below the knee, bind the cord tightly around the limb at the point indicated by the head of the *"lower limb"* arrow.

5. *Further Precautions.*—It is perhaps unnecessary to add that in the emergency of a mad dog bite the band for preventing the virus from entering the system should be applied as quickly and tightly as possible. If the material is at hand, several of such bands, tied one above the other,



ACCIDENTS AND EMERGENCIES-WHAT TO DO IF BITTEN BY A MAD DOG OR POISONOUS REPTILE

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will prove more effective than a single one. An additional emergency measure, and a very proper one, is to quickly cut the wound out with a sharp knife, and then to cauterize it with a hot iron, or such other means as may prove to be at hand. Make all haste to get the victim within reach of the proper remedies. (See Index.)

The Snake Bite.—The snake bites that are dangerously poisonous are those of the copperhead, water-moccasin, rattlesnake and viper. As in the case of the mad dog bite, several bands, tied one above the other, are better than one. The wound should be cut out, and then sucked. No harm can come from this if the mouth be free from sores, or the poison is not swallowed. In the absence of other means of cauterizing a snake bite wound, hunters pour powder upon it and explode it with a spark. The band or bands used should not be removed for some time, and in case of more than one, the uppermost one should be removed first.

Breathing, Restoration of.—Proceed as in Drowning.

Bruises.—See Contusions.

Broken Bones.—See Fractures.

Burns and Scalds.—These may be caused by contact with flames, hot metals, hot liquids, steam, electricity or chemicals. They are dangerous according to depth and extent. The skin may be but slightly inflamed or it may be blistered or charred. If the extent be large and the burn deep, it is apt to be fatal, especially in children. Shock is common after severe burns. If a person's clothes be on fire, throw him down and smother the fire with coat, blanket or rug (see Burning Clothing). The clothing should be cut away with sharp scissors. If any part of the clothing adheres to the flesh, do not attempt to remove it. In severe burns the patient may be put into a warm bath with the clothes on and then the clothing removed while he is in the bath.

Treatment.—In slight burns a piece of antiseptic gauze moistened with salt solution (1 teaspoonful of salt to a pint of warm water) will relieve pain, or it may be alleviated by covering with clean cloths wet with a warm solution of washing or baking soda, putting in as much soda as will dissolve. When pain is relieved, dress with boric acid ointment or vaseline. Kerosene oil or two parts of kerosene to one part of sweet oil also relieve pain. Other applications are carron oil, made by shaking together equal parts of linseed oil and lime water. This is a good household remedy to have ready made and always on hand for emergencies, but the bottle containing same must always be kept tightly corked or flies will

deposit their eggs and make it dangerous for use. Castor oil, fresh lard, cold cream or any fat that is not rancid are good applications.

Severe burns or scalds must be kept warm and the air excluded. They may be dressed with salt solution or with soda solution as described, if possible sterilized dressings, and then covered warmly with cotton and lightly bandaged.

Burns by sulphuric or other strong acids should be washed immediately and plentifully with an alkali such as the soda solution, lime water or milk of magnesia or covered with baking soda or powdered magnesia. Afterward follow the general treatment for burns.

Burns made by lye, caustic lime, soda or potash should be at once washed with a weak acid, such as vinegar or lemon juice in water, and then followed by general treatment.

External burns made by carbolic acid should be washed at once with alcohol, whiskey or brandy, or better still, quickly apply baking soda. If the acid has been taken internally, administer whiskey or brandy.

Burns by Powder.—*Characteristics.*—When it has been sufficient to produce rupture of the small vessels in the skin and subcutaneous tissue, an "ecchymosis" or bruise is present. The skin is darkened and discolored, and grains of powder are plainly discernible in the skin. When it so injures the deeper tissues as to cause effusion of blood from rupture of some of the larger vessels "extravasation of blood" is said to be present.

Symptoms.—Burns from powder produce an effusion of blood into the skin according to the force and distance employed, first as a livid red, deep blue or black patch, which in the course of twelve or eighteen hours becomes larger and lighter at its margins. About the third day it assumes a violet tint, on the fifth an olive brown, on the sixth a green, on the seventh or eighth it has a yellow aspect.

Consequences.—A severe burn may cause a rupture of a large artery or vein, under which circumstances a fatal extravasation may ensue. The effects also vary as regards locality. For instance, in an adult a burn of this character over the scalp may be followed by a local effusion of blood, and in a child this effusion may go on so as to form a swelling which in some portions of the body may give rise to enormous enlargement. In some cases the blood thus extravasated breaks down, as it were, and considerable suppuration takes place.

Treatment.—1. In the treatment a slight burn requires but mild treatment, cooling applications, and if advisable the grains of powder carefully removed. If extravasation of blood has taken place, it is to be

checked by a mixture of two parts common salt to three parts saltpetre applied to the surface, or the iced poultice made as follows:—Take of flaxseed meal a sufficient quantity to form a layer from three-quarters to an inch thick. Spread a cloth of proper size. Upon this at intervals of an inch or more place lumps of ice, the size of a marble. Then sprinkle them lightly over with the meal. Cover with another cloth, folding in the edges to prevent the escape of the mass, and apply the thick side to the surface of the wound.

2. A lotion of tincture of arnica, one ounce to a pint of water, appears to be beneficial in hastening the absorption of blood, removing pain, and so forth. Some of the stimulating liniments, such as the soap of opium, may likewise be employed. In more severe cases cotton, wool or lint soaked in oil and covered with oiled silk are the best dressings. Moist applications here rather do harm and should be avoided.

In all cases of severe burns a physician should be secured with least possible delay. If away from medical help and there is great suffering, one-quarter grain of morphine, twenty drops of laudanum or a tablespoonful of paregoric may be given an adult and repeated once or twice at half hour intervals if necessary. For children, the dose must be properly reduced. See general index for table of children's doses. An important matter in case of burns is treatment of the accompanying shock. See *Shock*.

Burning Clothing, How to Put Out.—If your own clothing catches fire do not run for help, as this will fan the flame. Lie down and roll up tightly in an overcoat, blanket, rug or anything of a woollen or cloth nature you can lay your hands on. If nothing obtainable to wrap in, lie down and roll over, slowly beating out the fire with the hands. If another person's clothing is on fire throw him to the ground and smother the fire with coat, blanket, rug, table cover or whatever of the kind at hand. When flames are extinguished, pour water on burning parts until last spark has disappeared.

Carrying the Wounded or Injured.—See Transportation of the Injured.

Choking.—It is a common experience to have something stick in the throat, especially with children. All sorts of things get in that are liable to cause suffocation. The sufferer turns purple in the face, the eyes protrude, he throws his arms about and sometimes falls unconscious. In other cases the obstruction lodges in the larynx or the windpipe, causing great distress and violent coughing.

Treatment.—Slap the sufferer forcefully on the back, or stand him

up face to the wall, his chest resting against it, and give him a severe blow between the shoulders. If a child, place one hand on each side of the chest and squeeze it vigorously and suddenly; or hold it with the head hanging down and slap the back while in this position. If something is supposed to be in the throat, perhaps a piece of meat, try to grasp by thrusting the thumb and forefinger down as far as possible, or try to hook it out with the forefinger. When the breathing is not seriously affected it is best to wait for medical aid, for unskilful handling may increase the difficulty, and it not unfrequently happens that the obstruction has passed down, leaving only an irritation that is mistaken for its actual presence.

When a button, coin or other such article has been swallowed by a child, do not give oil or other purgatives. If the object swallowed is sharp or angular it is a good method to give the victim rye bread, potatoes and cheese to eat, the idea being that the edges which might wound may become coated or enmeshed with these substances in such manner as to protect the stomach and intestines.

Circulation, Restoration of.—Get the patient into warm place. Remove clothing. Rub with hands or hot flannels and give alcoholic stimulants in small doses, or half a teaspoonful of aromatic spirits of ammonia in one or two tablespoonfuls of water, repeating dose if necessary; also hot tea, coffee, broth or hot water. A very efficacious remedy is a glass of hot milk in which half a teaspoonful up to one teaspoonful of cayenne pepper or paprika has been thoroughly stirred. Apply hot water bottle or other dry heat to the feet.

Cold, Exposure to.—See Exposure to Cold; also Circulation, Restoration of; also Frost Bites.

Compound Fracture.—See Fracture, Compound.

Compression of the Brain.—When by a blow or fall a fracture of the skull has occurred and there is a piece of bone pressing on the brain substance or an escape of blood within the skull, causing pressure on the brain, it is called compression of the brain, and the symptoms are the same as those of Apoplexy. In some cases the fracture is not apparent by any examination. It may be situated at the base of the skull. Bleeding from the nose or ears, or blood in the whites of the eyes may indicate such fractures. Emergency treatment is the same as for Fracture of the Skull, which see; also see Apoplexy. Do not give stimulants.

Concussion of the Brain.—This may be result of a severe blow upon the head or by falling on the head. The sufferer is stunned, is stupid, confused, sick at stomach, often vomits, lies pale and shivering, sometimes

faints and is more or less insensible, sometimes completely so, depending on severity of injury. Recovery is usually rapid, but after effects may last a long time.

TREATMENT.—Place patient in cool, quiet, dark room on his back, with head slightly raised. Unfasten any clothing that is tight about neck or waist. If patient shivers or seems faint and cold, apply heat as described under *Shock*. *Do not give stimulants in any head injuries.* After first shock has passed away apply ice to the head.

Contusions.—Ordinary bruises or contusions caused by falls or blows, consist of the rupture of small blood vessels under the unbroken skin and are indicated by the familiar black and blue marks.

TREATMENT.—Lay over the bruise a cloth saturated with hot water, or with half hot water and half alcohol, or either with witch hazel or tincture of arnica. Hot poultices lessen pain and aid in absorption of the blood. Frequently no treatment is needed.

Contusions with Injury to Internal Organs.—These may be serious and manifest various symptoms. If contusion of chest or abdomen there may be spitting or vomiting of blood or blood may be passed from bowels or bladder. There may be violent pain, paleness, fainting, depression and all signs of shock.

TREATMENT.—Treat the shock and hemorrhage as described under those headings.

Contused Wounds.—See Wounds.

Convulsions in Children.—Inject five grains chloral into rectum. Place child in warm mustard bath and then apply ice bag to spine. Another treatment is to dip a blanket in hot water and wrap child's naked body in it, taking great care not to burn. Cover this with a dry blanket. Next lay cloth in cold water on the head. If spasms continue, give teaspoonful of syrup of ipecac if it can swallow and follow with a tumbler of warm water. Then thrust finger down throat to hasten vomiting. Repeat ipecac every fifteen minutes if necessary for three or four doses. If spasms continue after child is in blanket fifteen minutes, give injection of soap and warm water and tablespoonful of castor oil as soon as he can swallow. Also see Index for other treatments. Remember that while one of these treatments should be commenced without a moment's delay, yet a physician should at the same time be immediately sent for, as although convulsions in children are most frequently due to some undigested substance, nevertheless, they are sometimes forerunners of serious diseases.

Cramps, Muscular.—When these occur in one of the legs (which is most frequently the case) take a strong cord, wind it around the leg where it is cramped, and taking an end in each hand give a sharp pull, strong enough to produce some pain. This will not only afford relief, but will generally prevent repetition for some hours. Another method is to press the toes forcefully on the floor or against end of bed, if occurring in night. These methods are not available with those seized with muscular cramps while swimming. In such case the swimmer should turn on his back and use his arms to keep himself afloat until the spasm is over.

Crushed Limbs.—See subheading under Wounds.

Cupping.—Where possible, cuts, wounds, etc., should be immediately sucked to draw out poison and frequently the patient can do this himself, but in many instances the wound is so situated that he cannot do so, and because of disease or for other reasons it may be dangerous or undesirable for anyone else to do so. Like results, however, may sometimes be obtained by "cupping," which in effect is a drawing of blood from a wound by vacuum, and thereby the poison fully or partially taken from the system before it has had opportunity to circulate. The inside of an ordinary tumbler is swabbed with alcohol just sufficiently to blaze when ignited and just before the flame dies away the tumbler is inverted and placed over and surrounding the wound, where it is firmly pressed. A partial vacuum forms within the cup (glass) as the air cools, and the poisonous blood from the wound and its adjacent parts is more or less thoroughly drawn up into the cup, either through the already open wound or through small cuts specially made for the purpose. Great care must be exercised in swabbing the glass that there is not sufficient alcohol to run to the edge of the glass or bad burning may result.

Cuts.—Simple cuts should be washed in clear water and allowed to bleed for a brief time that any poison may be expelled with the flowing blood. If cut caused by rusty or dirty instrument, wash with peroxide of hydrogen or other antiseptic, and dust with borated talcum or boric acid powder. Even the smallest cut, prick or scrape should be carefully treated, for blood poisoning may result from the most trifling wound. One of the most efficient means of extracting poison from small wounds is to suck them vigorously. If a little cut gapes open it may be brought together with a piece of sticking plaster through the middle, but never cover any wound entirely with plaster, though to protect it, a small, sterilized bandage or pad should be utilized.

If the wound is deep or an artery has been cut so that blood spurts out, follow directions given under Hemorrhage.

Dislocations.—If one bone is displaced from another at a joint the injury is called a dislocation. The ligaments that hold the joint in place have been torn, and there is pain, deformity and stiffness. It is sometimes difficult to distinguish dislocations from fractures near the joint, and for this and other reasons it is very unwise for any unskilled person to undertake treatment of any dislocation unless doctor cannot possibly be obtained. Pending arrival of physician, simply make the sufferer as comfortable as possible and lay a wet cloth over the affected joint. If it happens that professional aid cannot be secured, then be guided by the instructions given under respective subheadings as hereafter following, being very careful not to confuse fracture with dislocation.

1. **Dislocation of the Shoulder.**—Sometimes this is easily replaced, especially if dislocation has occurred previously. Lay patient on back and sit down on the injured side, facing his head. Draw down his arm, and while drawing down draw it over in front of his body to the other side. This will often pry the head of the bone into its place. As a fulcrum, you may take off your shoe and place your stockinged foot in the arm pit. Or, standing beside the patient as he lies on his back, draw the arm vertically upward. These manipulations should be executed with the greatest gentleness, yet with absolute firmness. If any difficulty be experienced, the attempt should be given up unless you can find out the cause of the difficulty beyond question. Follow with cold applications.

2. **Dislocation of the Fingers.**—This may be treated by pulling bones into place and following with cold applications.

3. **Dislocation of the Lower Jaw.**—The mouth is wide open and the lower jaw immovable and projecting. Place your two thumbs in the sufferer's mouth, one on each side and both resting on the lower back teeth. Press steadily but firmly downward, then a little backward, and the jaw should go into place with a snap. But before putting your thumbs in the mouth, protect them by wrapping them in handkerchiefs as otherwise, when the jaw goes into place, the thumbs are apt to be caught between the teeth and be more or less seriously injured, and there will be two patients instead of one.

4. **Other Dislocations.**—Excepting under most exceptional cases, dislocations other than those of shoulders, fingers and lower jaw had much better be left alone until surgeon arrives, even if much delayed, as more

harm is apt to be done by unskilled handling than by waiting. If situated where impossible to obtain medical aid, consult chapter on surgery.

Dog Bites.—See Bites of Dogs.

Drunken Stupor.—See Intoxication.

Delirium Tremens.—See special article as per general index at end of book.

Drowning.—See Rescue from Drowning.

Electricity, Accidents from.—First remove sufferer from influence of current; but for his own safety and that of others present, the rescuer must use the greatest precautions, as it often entails great danger. Beware of third rails, swinging wires and wires of all kinds. Unless proper precautions are exercised a person in contact with a wire or rail will transfer the current to the rescuer. He must not touch the unfortunate victim unless his (the rescuer's) own body is thoroughly insulated. The rescuer must act very promptly, for the danger to the victim is much increased the longer the electric current is allowed to pass through his body. If possible, the rescuer should insulate himself by covering his hands with a mackintosh, rubber sheeting, several thicknesses of silk or even a dry cloth. In addition, he should complete his insulation by standing on a dry board, a thick piece of paper or even on a dry coat. Rubber gloves and rubber shoes or boots are still safer, but cannot usually be procured quickly. If a live wire is under the victim and the ground is dry, it will be safe to pull him off the wire with the bare hands if care be taken to touch only his clothing, but this must not be attempted if the clothing be wet or damp. A live wire lying on a patient may be flipped off with a dry board or stick. Do this with one motion, as rocking the wire to and fro will increase shock and burn. A live wire may be cut by an axe or hatchet with dry, wooden handle. The electric current may be short-circuited by dropping a crow-bar or poker on the wire. These must be dropped on the side from which the current is coming and not on the farther side, as the latter will not short-circuit the current until after it passes through the body of the victim. Drop the metal bar; do not place it on the wire or you will then be made a part of the short circuit and receive the current of electricity through your own body.

Always send for a doctor, but do not wait for him. Treatment should be given even if the victim appears to be dead. Loosen the clothing around neck and body and then proceed to restore breathing by artificial respiration as in Drowning.

Ear.—See Foreign Bodies in Ear.

Eye.—See Foreign Bodies in Eye.

Epileptic Fits.—Those who are subject to epilepsy usually know by a peculiar feeling that an attack is about to come on. Following this the face becomes pale, and sometimes uttering a peculiar cry, the victim falls unconscious. The face now becomes congested and violent convulsions follow. The tongue is sometimes bitten and bleeds, there may be frothing at the mouth, the eyes roll and are turned upward. A single attack lasts from a second to several minutes, but there may be a series of attacks, one succeeding another with scarcely appreciable intervals for an hour or more. After an attack the victim usually has a headache and a great desire to sleep. Sometimes, however, he becomes violent and dangerous.

Treatment.—See that the victim lies flat, and guard him against injuring himself. If possible place a cork or piece of folded cloth between his teeth to prevent him from biting his tongue. Do not endeavor to break his "grip" as it is called. Oftentimes people think this necessary, and a strong man will sometimes force open a delicate hand with a violence that may lame it for weeks. When the fit is over permit the patient to sleep in a cool room as long as he will. Be on your guard for periods of violence.

Expiration.—See Respiration.

Exposure to Cold.—During intense cold frost bites and the freezing of nose, ears and other extremities quite commonly occur. Usually they do not affect the system generally and require but simple local treatment. (See Frost Bites.) But exposure to cold weather, accompanied by actual freezing of any part of the body or not, may affect the whole system and require special treatment. Even when the temperature is not excessively low, long exposure may cause a general chilling of the whole body, resulting in depression and sometimes in insensibility or even death, although no part may be frozen. Especially is this apt to occur during exhaustion from overwork, long exposure in an open boat, long marches, and in those whose vitality is lowered by lack of food or any other cause. Chilling may take place insidiously and without the person being aware. The blood becomes chilled, circulation is impeded, and there is grave danger of general collapse.

Treatment.—If there are no frozen parts, treat as for restoration of circulation—that is, get the patient into a warm place, remove clothing, rub with hands or hot flannels and give alcoholic stimulants in small doses, also hot tea, coffee, broth or hot water. A glass of hot milk in which half a teaspoonful up to a teaspoonful of cayenne pepper

or paprika has been thoroughly stirred usually gives excellent results. Apply hot water bottle or other dry heat to the feet. If the person is insensible, artificial respiration may be necessary (see artificial respiration in drowning accidents).

If any part of the body be frozen, this must be given first attention. It has been taught almost universally that a frozen limb should be put into cold water or rubbed with snow, and while this method may be safely adopted in the case of frost bites to nose and ears, it may prove dangerous to a person who is seriously frozen, and especially if exhausted, and it is now recommended that the patient be immediately immersed in a warm bath, which should be made gradually warmer until it is as hot as can be borne. This method has been endorsed by surgeons accompanying arctic expeditions, and has been adopted by some of the world's best life-saving societies, such, for instance, as the New York Society for First Aid to the Injured. But it is to be borne in mind that under no circumstances should dry heat be applied to frozen parts. See Frost Bites.

Factory Accidents.—See Wounds.

Fainting.—The pale, bloodless face in fainting is well known. It indicates a like bloodless state within the brain. The action of the heart has been weakened for the time and there follows a lessening of the blood supply to the brain. This causes a loss of consciousness. The pulse is slow, feeble and sometimes absent.

TREATMENT.—Lay the fainting person down at once. If on a sofa or bed let the head hang over so that it will be lower than the body, and raise the feet on a couple of cushions or pillows. This position enables the heart to more easily send blood to the brain. Expose the face to cold air, sprinkle it with cold water and hold ammonia or smelling salts to the nose, and also administer internally half a teaspoonful of aromatic spirits of ammonia in one or two tablespoonfuls of water. If the fainting spell continues, treat it like a case of shock. Remember as of vital importance that the person who has fainted must be laid down flat and the feet raised higher than the head, in order to increase the flow of blood to the brain.

Fish-Hooks, Extraction of.—When a fish-hook becomes imbedded in the flesh beyond its barb, it is a very painful matter to extract it without proper instruments and knowledge of their use, and so if a physician can be seen within a reasonably short time, it is better to leave the hook in the flesh until he can give it attention, as by a very simple incision with proper and aseptic instruments he can remove it with little pain and no

danger of after poisoning. However, where resort cannot be had to a doctor the hook must be taken out. To pull it out in the ordinary way tears the flesh, is very painful and leaves a nasty wound. The following is therefore recommended as a more satisfactory method: Turn the hook in the flesh until the barbed point is directed outward to a different part from that at which it entered and push it through the skin at this new point until the barb is clear. Then with a pair of wire clippers, snip off the barbed end, when the hook may be drawn through its original entry point without difficulty. (If no clipper is at hand, the barb may be filed away with same results.) Then thoroughly suck the wound to withdraw any poison. Bandage and treat as an ordinary wound.

Foreign Bodies in the Eye.—In case of a foreign body in the eye attempts may be made to remove it as follows: Wink rapidly a few times, at the same time blowing the nose, and it may be carried to the corner of the eye, where it may be removed with the corner of a handkerchief or a bit of cotton twisted about the end of a match. Draw down the lower lid and if the body is seen remove it in the same way. Drawing the upper lid over the lower by means of the eyelashes will sometimes remove the body. If this fails, the eyelid may be rolled over a pencil or match by pulling the lid away from the eye and, having the patient look at his feet, you press the back part of the lid down with the pencil laid across it above the eye. The particle will often be found adhering to the inner surface of the lid, and when detected can generally be wiped off with a bit of absorbent cotton or soft cloth, care being taken not to touch the ball of the eye. A drop of castor oil may be put in the eye to relieve irritation and a grain of linseed placed in the corner of the eye and the lid gently worked with an inward rotary motion often proves successful when other methods have failed. If these simple methods are not availing, see a doctor at once.

Foreign Bodies in the Nose.—These are frequently in the form of beads, buttons and so forth pushed up by children with desire to see what they may do. They may sometimes be driven out by violent sneezing produced by snuff or by tickling the inside of the nostril with a feather. If such means are ineffective, call a physician at once. He can generally readily remove such objects with suitable instruments.

Foreign Bodies in the Ear.—Insects and certain other foreign bodies in the ear may generally be removed by syringing with warm water (be very careful it is not hot). If no syringe at hand, let the patient lie down on the opposite side and fill the auditory canal with warm water, but while

this is perfectly safe in case of an insect or any foreign body that will not swell, it must be remembered that if the foreign body be of such nature that water will make it swell, then this method must not be used. No further attempts should be made except by physician, whom see at once.

Fingers, Dislocation of.—See Dislocations and Wounds.

Fits.—See Epileptic Fits.

Fits in Children.—See Convulsions.

Fractures.—A fracture is a broken bone. There are different kinds of fractures, but in general classification they are either simple or compound. A simple fracture is one in which the skin is not injured, so that no matter how much the bone is broken up, there is no communication of the fragments with the open air. A compound fracture is one in which the breaking of the bone is accompanied by a wound, caused either by the same force which produced the break, as, for instance, a bullet, or by the ends of the broken bones protruding through the skin. Compound fractures are much more dangerous than simple ones, chiefly because whenever the skin is broken disease-producing germs are apt to gain entrance to the tissues and set up the process of suppuration, or forming of pus.

It is sometimes very difficult to tell whether or not there is a fracture, but it may usually be recognized by the following indications: First, that the limb is altered in shape, bent or shortened at a point where there is no joint, inequality often being felt on running the finger along the broken bone; second, by there being an unnatural degree of movement at the seat of injury; third, by the inability of the patient to use the part; fourth, by the patient feeling severe pain at a particular point, and this point being painful to the touch; fifth, by the grating of the broken ends of the bone, which may be felt and sometimes even heard when the limb is moved; sixth, by a careful comparison of the injured limb with the sound one. The person who extends first aid, however, should never try to diagnose by trying for false or unnatural movement nor by causing the grating of the bones just described, as so doing may result in getting the bones still more out of place.

Treatment.—Where fracture is suspected have the patient lie down in as comfortable position as possible. Then very gently and slowly remove enough clothing to expose the injured part, cutting or ripping if necessary with knife or scissors. If the limb is very visibly deformed, try to straighten it by grasping the limb below the deformity and pulling gently and steadily in a straight line with the limb. Support the limb in its corrected position by slipping a pillow or cushion under the injured

part, and tie it around the limb with two or three handkerchiefs, suspender straps or strong cords. A folded coat or two may be made to answer the same purpose. One should have an assistant in this. Then await the arrival of the doctor. There is no need for hurry in further setting the fracture, but if a physician cannot be obtained, or the patient must be moved, improvise a splint suitable for the fracture. Splints may be made of anything that is stiff and rigid. Something flat like a board is better than a pole or staff, yet limbs broken off a tree will do if nothing else can be found. Shingles make excellent splints. In applying splints, remember that they should extend beyond the next joint above and the next joint below, otherwise movements of the joints will cause movement of the broken point. If possible secure two pieces of thin board as wide as the limb is thick and long enough to extend beyond the joints above and below the fracture. Cover one side of each splint with a pad made by folding up pieces of cotton batting or a number of thicknesses of the softest cloth at hand. Now tie the splints firmly one on each side of the injured limb, with several strips of cloth, handkerchiefs, bicycle tape or other like binders, in such manner as to keep the broken ends of the bone immovable. If single pieces of board of proper length are not available, a number of smaller pieces of even thickness may be laid side by side (such as shingles) and the whole held firm by canes or poles of sufficient length being bound on the outside. In emergency, almost anything may be used, barrel staves, pasteboard boxes, cigar boxes, pieces of sole leather from nearest shoemaker, stockings stuffed with bran, sand or other material. For padding inside the splints and against the injured limb, use cotton batting, cloth, hay, straw, leaves folded up in handkerchiefs, a piece of a shirt, or leaves or grass stuffed into a shirt sleeve or coat sleeve. In railway accidents stuffing out of the seats is often used. Never bandage a fractured limb before applying splints unless to hold a necessary dressing in place, and in such case the dressing should be large and thick and the bandage only applied over the dressing, the reason being that otherwise, after swelling of the limb may cause the bandage to become too tight. Never move an injured patient until careful examination for fracture has been made and splints applied, if necessary. The best way to move a patient is on a stretcher, which may be improvised from shutters, doors, etc. See instructions in Transportation of the Injured in this same chapter. Read also article on Bandaging; also examine following particulars as to specific fractures.

Fractures, Compound.—Should there be a wound in connection with

any fracture, place a large pad or compress of sterilized gauze, or other sterilized material, over the wound and bandage in place. This is of great importance. It is wiser to leave the wound untouched until sterilized material can be secured, or prepared by boiling, than to dress with unsterilized material. Then proceed in same manner as with simple fractures. (See preceding item.)

Fracture of the Arm.—A padded splint should be placed on the arm from the highest part of the shoulder to the point of the elbow, then place a shorter one on the inside of the arm, taking care that it does not cut into the arm pit or the bend of the elbow. Then put the hand in a sling. Read carefully the general instructions regarding fractures in this emergency chapter.

Fracture of the Forearm.—First bend the elbow at a right angle and place a broad, well-padded splint, reaching to the ends of the fingers along the back of the forearm and hand. Now, place another splint on the front of the arm and bind them on firmly. Be careful that the splint does not cut into the bend of the elbow. Read carefully the general instructions regarding fractures in this chapter.

Fracture of the Elbow.—Put the arm in as comfortable a position as possible, apply cold cloths and await arrival of physician. This fracture requires the most skilled work and only under extraordinary circumstances should a non-professional person attempt any treatment.

Fracture of the Ribs.—See general article on Fractures in this emergency chapter. In addition to some of the usual signs of fracture there is commonly difficulty in breathing and sometimes spitting of blood.

Treatment.—The whole chest should be firmly bandaged with a roller bandage. If there be spitting of blood, keep the patient quiet. Secure aid of physician as soon as possible.

Fracture of the Spine.—If the neck or back has been injured and the patient cannot move the lower limbs, fracture of the spine may be suspected. In this case if the patient be in a safe and sheltered place do not move him at all, but await physician. If environment makes it necessary to move him, then endeavor to place him on stretcher with the least possible movement of the head and body.

Fracture of the Thigh.—A long splint should be applied from the arm-pit to the foot and another on the inner side of the thigh from the crotch to the foot. Place bandages around body, thigh and leg. In women the other leg may be used for an inner splint and the bandages placed

around both legs and the outside splint. Read carefully the general instructions regarding fractures in this emergency chapter.

Fracture of the Jaw.—Close the jaw so as to bring the teeth against each other and bandage with four-tailed bandage described in article on bandaging (see general index).

Fracture of the Collar Bone.—The patient should be placed on his back on the floor with a blanket beneath him and have him remain there until physician arrives. If necessary to move him, bind the elbow to the side and support the hand and forearm in a sling. See instructions regarding Fractures.

Fracture of the Leg.—Follow instructions as to splints, etc., as described in general instructions regarding fracture in this emergency article.

Fracture of the Nose.—Apply cold compresses and see physician.

Fracture of Skull.—This may be caused by a fall or a blow on the head, and there may or may not be a wound. Symptoms of concussion or compression of the brain may appear. (See Compression and Concussion of the Brain.)

Treatment.—If fracture is suspected, carefully dress any wound on the head and place the patient in a cool, dark, quiet room. He should lie on the back, the head slightly raised. Apply wet, cold cloth to the head. Do not give any stimulants. Secure physician at once.

Frost Bites, Frozen Limbs, etc.—In severe winter weather any exposed or insufficiently clad part of the body is liable to become frozen, and this is especially likely with the extremities such as nose, ears, fingers, toes, etc. The parts first become blue, then purple and then white and stiff. When solidly frozen the part becomes as hard as stone and at the same time is very brittle so that, for instance, were you to strike a solidly frozen ear, it would break off. Freezing is apt to occur without the victim being aware of the fact. It may usually be prevented by rubbing any part which feels very cold, as this brings warm blood to the surface. The danger is when after being cold the part suddenly has no feeling. The object of treatment is to gradually restore circulation to the congealed part. Application of snow or cold water to the frozen part, gently rubbing and pinching it, is the most common method of restoration, but care must be taken in severe cases to do this so gently as not to break off any brittle part. Under no circumstances should dry heat be applied nor hot water, as either of these methods is apt to cause mortification of the frozen part; but it is now recognized that the most efficacious treatment is that of

commencing the thawing process with water that is merely warm and then gradually as the thawing takes place making the water warmer until it is as hot as may be borne. See full dissertation on this point under Exposure to Cold.

Frozen Limbs, etc.—See Frost Bites and Exposure to Cold.

Gas Poisoning or Asphyxiation from Gas.—This may occur from escape of illuminating gas from incompletely turned off jet, leak in gas pipe, etc., or from escape of coal gas from stoves, from the burning of charcoal and in other ways. If gas is in evidence be very careful not to take a lamp into the room nor to strike a match, as explosion may occur. The first thing is to get air to the victim or else the victim into the air—raise or smash windows or do anything necessary to let in the air. On entering gas filled room for purpose of rescue, beware of being overcome yourself. Generally less gas will be found near the floor of a room, and so one may be able to creep where it would be dangerous to walk. Fresh air having been gained and the victim being unconscious, proceed at once to restore breathing as described in respect of drowning. Use stimulants moderately and work to restore perfect circulation. Keep patient awake.

Hanging.—Cut patient down, then use treatment for Drowning and Gas Poisoning.

Heatstroke or Sunstroke.—This is induced by exposure to excessive heat, either with or without direct rays of the sun. There are certain general symptoms of its oncoming which should serve as a warning—headache, a sense of weakness at the pit of the stomach, a weakness of the knees, dizziness and sometimes vomiting and disturbed vision. These symptoms may gradually merge into unconsciousness or without warning the stricken one may suddenly collapse and lie insensible. A characteristic condition is the intense, burning dry heat of the face, head and body. The face itself becomes red and flushed; the pulse is full and rapid; convulsive twitchings of various parts of the body are frequently observed.

Treatment.—Endeavor at once to reduce the heat of the body. Undress the patient, wrap the body in a sheet and keep the sheet wet with cold water by frequent sprinkling. Continue this until consciousness returns and the body feels cool. If after becoming conscious the patient relapses into unconsciousness, the cold water process must be repeated. If impossible to immediately follow the above treatment, then wring out cloths in ice water, or coldest to be had, and place them on the head, back of the neck and around the wrists.

NOTE.—Sunstroke or Heatstroke is quite different from *Heat Exhaustion,* for which see next following item.

Heat Exhaustion.—This is due to similar cause, but is characteristically different from Heatstroke. The face instead of being greatly flushed will at most be but slightly so, and is more apt to be pallid, while the skin instead of dry and burning will be found moist and even cool—the pulse is frequent and feeble.

TREATMENT.—Do not apply cold, as temperature is not to be reduced. Place sufferer in a cool, quiet room and give stimulants gradually. Keep patient warm by use of hot water bottles or other dry heat, but do not bring on perspiration. Build up with broths and light, nourishing food.

NOTE.—Heat exhaustion is far more common than heatstroke. Usually cases only occur after several days of continued heat. Debility and alcoholism strongly predispose attacks. (See Heatstroke.)

Hemorrhage, or Bleeding from Wounds.—All wounds, even a pin prick, will bleed, but unless an important vein or an artery is penetrated, the bleeding will usually stop of itself if the blood be allowed to clot and so close the aperture of escape. It follows that to keep wiping and bathing a simple wound, as so frequently is done, hinders nature in its method of stopping the flow by clotting or coagulation of the blood. Bleeding to death even from the slightest of wounds would be a common occurrence were it not for the clotting of blood. While on general principles this shows the vital importance of leaving it to nature to stop the bleeding by coagulating the blood in the wound, yet it must always be borne in mind that there are rare cases where the blood has no power to coagulate, and with individuals so affected there is danger of bleeding to death even from slight wounds if extraordinary precautions are not taken. But remember that a very little blood makes great showing and people are often unnecessarily frightened by a flowing of blood that will soon stop of itself if left alone or if the part be elevated as by holding a cut finger above the head, or if a small compress and bandage are applied, or light but steady pressure made in any way on the part which bleeds.

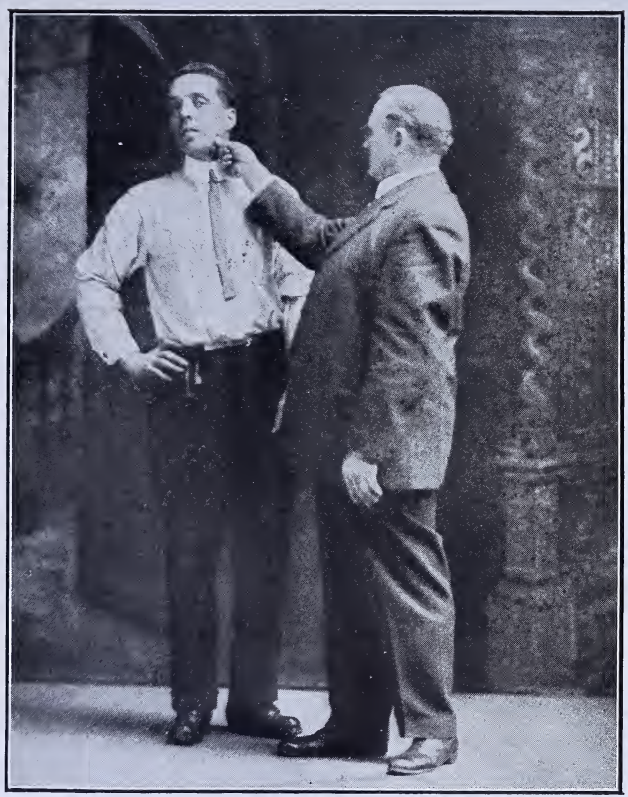
To stop bleeding from any external wound, the patient should first lie down, the bleeding part raised as high above the rest of the body as possible. This of itself will sometimes check the bleeding if the blood vessel wounded is but a small one or a vein. Cut away or otherwise remove any clothing necessary to fully expose the wound. If the bleeding continues after lying down, make a compress with a sufficient quantity of sterilized gauze or absorbent cotton or if these are not obtainable, then by

folding any clean cloth, as a couple of clean handkerchiefs or a piece of a clean shirt or skirt. Make a rather thick pad somewhat larger than the wound and place it over the wound, binding it on tightly with a handkerchief, strip of cloth, pair of suspenders or anything of sufficient length that may be used as a bandage. Watch closely for a few minutes and if blood continues to flow freely through or around the compress, apply another on top of the first one, binding it on more tightly, and with the fingers make steady and continuous pressure on the compress. If the wound in a limb still continues to bleed freely, apply a tourniquet (see description regarding "tourniquet"), still keeping the limb elevated. A tourniquet may be very painful and moreover may do harm. It is frequently needlessly used to stop bleeding that a compress and bandage with finger pressure would easily control, and so the tourniquet should only be resorted to when these methods have failed. In the case of hemorrhage from a wound on any part of the body where a tourniquet cannot be readily applied, such as head, neck, trunk, or limb wounded too high up, the compress and finger pressure are the only practical methods for other than a doctor to attempt. In cases where use of the tourniquet seems necessary, the following instructions may aid:

1. **The Tourniquet.**—Take a strip of strong cloth, handkerchief, towel, pair of suspenders or other material immediately at hand, wind it loosely one or more times about the limb between the wound and the body and tie the ends together. Take a smooth, round stone, apple, potato or any hard, smooth object (or lacking such a tight wad of cloth) and place it under the bandage between it and the skin and over the seat of the main artery. Then pass a cane, umbrella, ruler, stick, or rod of any kind, under the bandage on the other side of the limb and twist the bandage with the rod until the stone or wad is pressed firmly into the limb and the bleeding stops. The tourniquet may be left in place until the physician comes, or, if very painful, or after half an hour has elapsed, may be very slowly relaxed, tightening it again if the bleeding recommences. *If the position of the main artery is not known or cannot be remembered, apply the tourniquet without the stone or wad.*

2. **To Locate Main Arteries.**—*a. Hand or Arm.*—Apply tourniquet to upper arm above wound, with the stone or wad on the inner side of the arm.

b. Foot, Leg or Thigh. Apply tourniquet at upper end of the thigh with the stone or wad placed one inch below the centre of the crease of the groin.



No. 1.—Bleeding of the nose may be checked by pressing with the thumb and finger upon the sub-maxillary artery under the lower jaw, about half way between chin and ear. It may be identified by a slight indentation of the lower jaw at this point.

No. 2.—Bleeding of the artery of the thumb or of the forefinger may be checked by pressure upon the wrist above the thumb.

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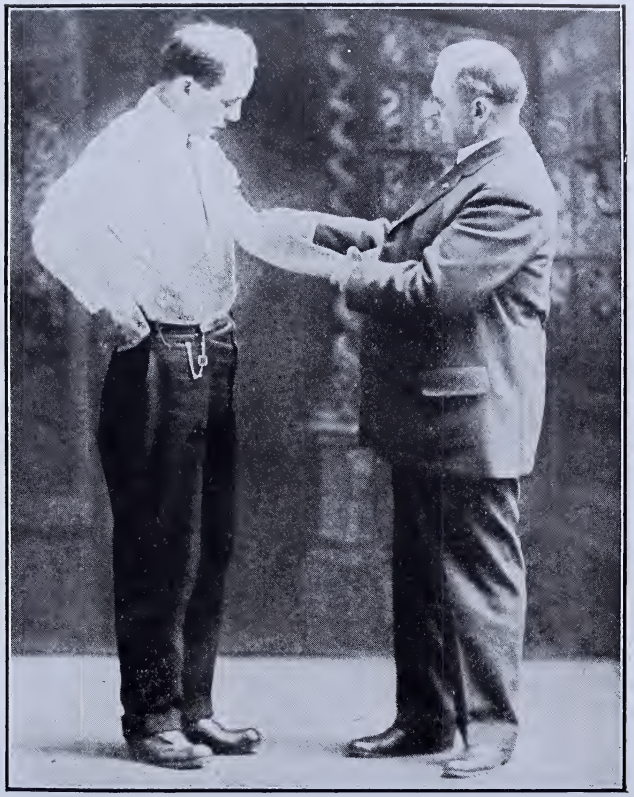
No. 3.—Bleeding of the artery of the second, third and fourth fingers may be checked by pressure upon the wrist above the little finger.



No. 4.—When artery in forearm is affected or limb torn off below the elbow, bleeding may be checked by firm pressure just above the joint.

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No. 5.—Bleeding of an artery below the knee may be checked by firm pressure on the inside of the knee about three and a half inches from the knee-cap.

No. 6.—Bleeding of artery in the thigh may be checked by placing the thumbs in center of the thigh one inch below the groin and pressing them with force to the bone. Immediate action is necessary as patient may bleed to death in four minutes if flow of blood continues.

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3. While the tourniquet is being prepared and applied, pressure must be made by another person, or even by the injured person himself if no one else available, the thumbs or fingers being pressed tightly against the place which the stone or wad of the tourniquet is to occupy.

4. A careful previous study of the colored plates 1 and 2 in this chapter in conjunction with the descriptive matter on the opposite pages will give a knowledge of the location of veins and arteries that may prove invaluable.

Hemorrhage of the Lungs.—This is generally shown by the coughing up of bright, frothy blood. It often gives much alarm, but is not usually dangerous.

Treatment.—Perfect rest in bed in a cool room, with head and shoulders raised. Give patient small piece of ice to swallow and small doses of dry table salt and reassure him by telling him there is no danger. See special medicinal treatment per general index.

Hemorrhage of Varicose Veins.—Swollen or varicose veins in the legs, when ulcerated, sometimes burst and even fatal hemorrhage may result if the accident is not properly treated. The bleeding, however, may be stopped immediately by placing the tip of one finger on the bleeding point. The patient should be lain down and the leg raised perpendicularly and a compress and firm bandage applied over the ruptured vein. Ordinary position may then be resumed. The simple elevation of the leg will usually stop this hemorrhage.

Hemorrhage of the Stomach.—Dark blood in clots is vomited, usually resembling coffee grounds, but sometimes mixed with bright blood.

Treatment.—Same as for Hemorrhage of the Lungs.

Hemorrhage of other Internal Organs.—Bleeding from other internal organs should be treated much as in case of stomach and lungs. Get the patient to bed and insure perfect rest in a cool room.

Special Note.—In all internal hemorrhages summon a physician, informing him of the exact nature of the trouble at the time of calling him.

Hemorrhage Through the Nose, or Nose-Bleed.—Frequently this is nature's way of relieving some internal condition, and within reasonable limit is often of considerable benefit. Usually it will stop of itself in a few minutes. It is seldom serious, yet with weak or anæmic patients or where the blood continues to flow copiously for a considerable time it may prove so.

Treatment.—In ordinary cases of bleeding of the nose a well-recommended remedy is the following, in respect of which for clearness of de-

HOW TO STOP BLEEDING FROM WOUNDS.

The Emergency.—In case of severely bleeding wounds, quick work is required to save life. One must know not only what to do, but how to do it.

The Arrows.—The arrows in the adjoining plate show the places on the body where pressure is to be made in order to stop the flow of blood.

Kinds of Pressure.—In ordinary wounds the pressure may be found sufficient when made with the index finger or the thumb. In severe wounds, and where the arteries or veins lie deep, the firm pressure of both thumbs may be required. In still more severe wounds or where the thumbs becomes tired resort may be had to the tourniquet. The following illustrations are from actual photographs showing exactly where pressure should be brought to bear and giving explanation under each illustration.

Places of Pressure.—1. If the wound is upon the forehead, place the index finger or thumb upon the spot indicated by the head of the *"forehead"* arrow, and exert firm pressure.

2. If the wound is upon the scalp, place the index finger or thumb upon the spot indicated by the head of the *"scalp"* arrow, and press firmly.

3. If the wound be upon the face, press the index finger or thumb upon the spot indicated by the head of the *"face"* arrow.

4. If the wound be upon the head or upper part of the neck, in other words, above the shoulders, the pressure must be made on the spot indicated by the head of the *"neck and head"* arrow. Press hard.

5. If the wound be on the arm, make the pressure on the inside of the arm, at the spot indicated by the head of the *"arm"* arrow. This pressure will stop the bleeding of a wound anywhere below the neck and above the heart. It must be made on the inside of the arm nearest wound.

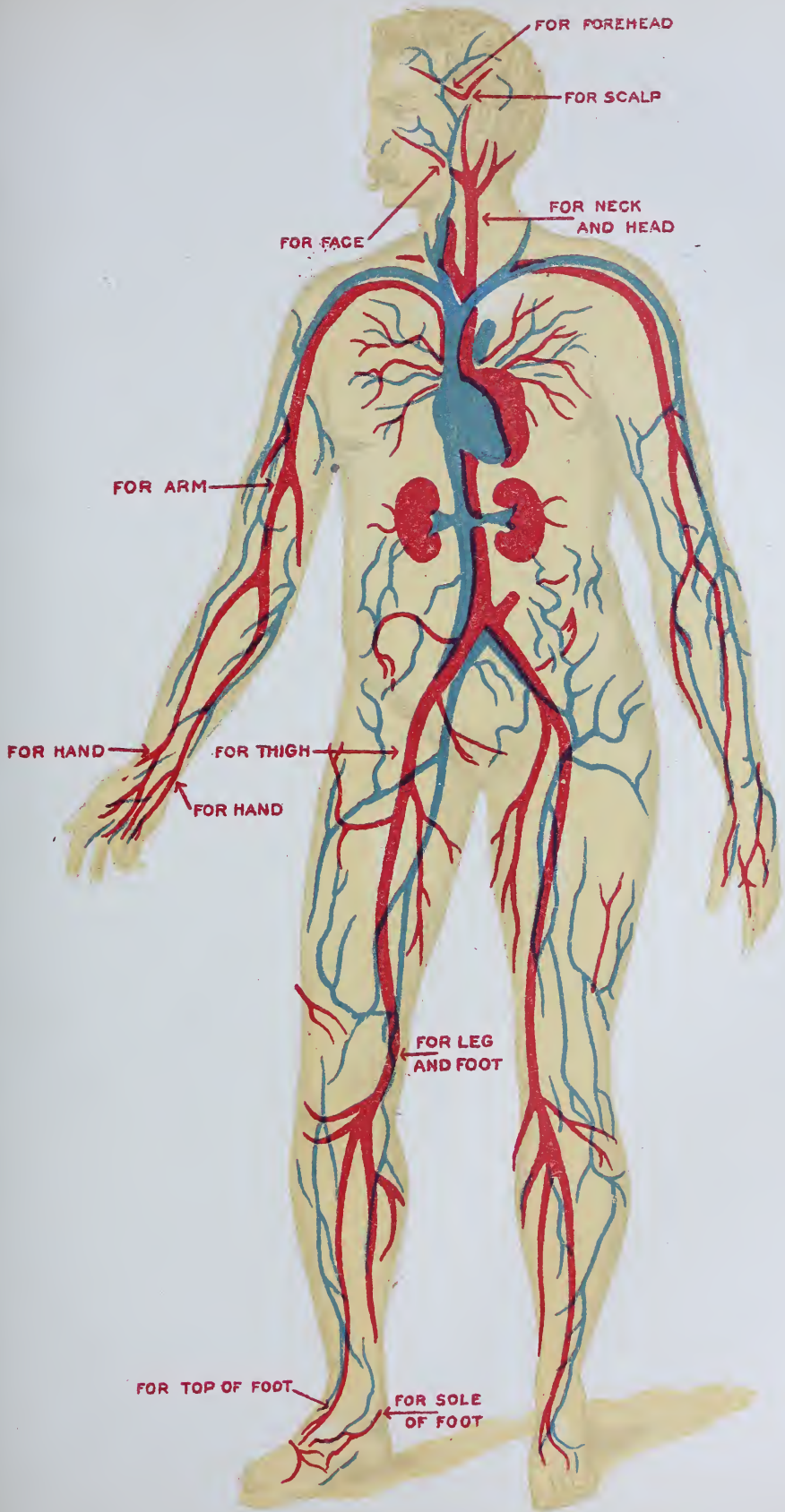
6. If the wound be on the hand, make the pressure on the places indicated by the heads of the *"hand"* arrows.

7. If the wound be on the body anywhere below the region of the heart, the pressure must be exerted very firmly on the inside of the thigh, at the point indicated by the head of the *"thigh"* arrow.

8. If the wound be on the lower leg or foot, the pressure must be made on the spot indicated by the head of the *"leg and foot"* arrow.

9. If the wound be on the top of the foot, make the pressure at the spot indicated by the head of the *"top of foot"* arrow.

10. If the wound be on the sole of the foot, make the pressure on the spot indicated by the head of the *"sole of foot"* arrow.



ACCIDENTS AND EMERGENCIES—How to Stop Bleeding

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scription we will assume blood to be flowing from the right nostril: The sufferer stands and in first place cleans the nostrils by a good blowing into handkerchief, then with head erect he places the forefinger of the right hand against the right or bleeding nostril and presses tightly, while at the same time he raises his left arm upward as if he were reaching strenuously for something above him, the palm open and fingers extended. Continue fixed in this position for one full minute, then release the nostril, when the flow will usually have stopped. If not, continue for another minute. Three minutes is an outside limit for results. If it be the left nostril that bleeds the position of the hands would simply be reversed. This method has the great advantage that when the bleeding has stopped there is no clotted blood or bloody mucous in the nostril, the air passage being left as clear and free as if there had been no bleeding.

The following are usual methods, but all have the disadvantage of leaving more or less clotted bloody mucous in the nostril:

1. Do not blow the nose. See that there is nothing tight about the neck. Keep quiet, either sitting or standing, with head bent slightly forward. Apply something cold to bridge of nose and back of neck. Breathe in cool air through the nose and breathe out through the mouth.

2. Put hands in a basin of water as hot as can be borne.

3. Sniff ice water up the nose a few times and then hold the nostrils closed with the fingers for five minutes.

4. Place a piece of blotting paper between the upper lip and the gums and leave it there for a considerable period. If no blotting paper at hand, coarse brown or any paper of absorbent nature may suffice.

If none of the foregoing measures are successful in stopping the flow of blood then summon a physician without delay, informing him of the nature of the trouble when doing so.

Hydrophobia.—See Bites of Dogs.

Hysteria.—See special article in chapter on Nervous Diseases; also index for other references, treatments, etc.

Hysterical Unconsciousness.—The patient, usually a woman, may appear to be insensible or to wish to be thought so; the body being limp and the eyes closed. However, if any attempt be made to open the eyelids to examine the eyes, it is resisted and the eyeballs are kept rolled up in the head, a characteristic sign of hysteria which is not in evidence in unconsciousness from other causes. The usual pallor of fainting is not present, the pulse is apt to be natural, certainly not absent nor very feeble or slow,

and inquiry will generally elucidate the fact that the patient is subject to hysterical attacks.

TREATMENT.—The best treatment is to leave the patient in charge of a quiet, kindly, unexcitable attendant, who should speak firmly and endeavor to make patient gain self control. (See Unconsciousness.)

Insensibility.—See Unconsciousness.

Internal Bleeding.—See Hemorrhage.

Internal Organs, Injury to, Protusion of, etc.—See Wounds of Internal Organs, etc.

Intoxication—Drunken Stupor, etc.—A person in a drunken stupor closely resembles one in a fit of apoplexy. When the breath does not smell of liquor it is not drunkenness. But the mere fact that the breath smells of liquor is not evidence that the patient is drunk. A man may have taken a drink without its making him drunk and without his being in any sense the worse of liquor, yet with the odor on his breath, he may have an apoplectic fit, or liquor may have been administered to him after the fit. These facts sometimes make it difficult to distinguish the true condition. In drunken stupor the face is not drawn to one side and the cheeks do not puff out in breathing as occur in apoplexy. Snoring ceases for the moment in drunkennness if effort be made to arouse; in apoplexy it does not. In drunken stupor, there is no one-sided paralysis as in apoplexy. The pupils of the eyes are of equal size and when the ball of the eye is touched the eyes close quickly; they do not in apoplexy. In apoplexy the pulse is slow, full and hard; in drunken stupor it is feeble and soft and increased in frequency. As a rule, the patient can be roused to speak in the manner peculiar to a drunken man; in apoplexy he cannot. If the least doubt exists as to whether a person is intoxicated or has had an apoplectic attack, he should invariably be treated as if it were the latter. It is to be borne in mind also that death may result from an overdose of alcohol.

TREATMENT.—If the case is one of intoxication, give an emetic of a tablespoonful of mustard in a tumbler of warm water. If there are indications of shock—that is, cold, clammy skin and feeble pulse, the patient must be treated as for *Shock,* eliminating, however, the doses of alcoholic stimulants and substituting therefor hot broths and the like. Yet, as the stupor wears off, it may be necessary to administer small doses of liquor for a time, because if a man who has been accustomed to drinking heavily be suddenly completely deprived of liquor, there is the possibility of the onset of *delirium tremens.* The procedure as to giving or not giving a certain amount of alcoholic stimulant must there-

fore be governed by the circumstances of each individual case. An article on *Delirium Tremens* will be found by reference to general index.

Ivy Poisoning.—This is a condition caused commonly by the poison oak or poison-ivy. It is characterized by redness, burning, itching and generally by swelling with a vesicular eruption.

Valuable applications are those of cloths wet with lead-water and laudanum, black wash or phenol-sodique one part, water eight parts. Mild ointments give relief, especially oxide of zinc ointment containing ten grains of carbolic acid to the ounce.

Jaw, Dislocation of.—See Dislocation of Jaw.

Jaw, Fracture of.—See Fracture of Jaw.

Lightning Stroke.—Place the victim in a current of fresh air, dash cold water on face and chest; if body be cold use lively friction with hands or flannel. Manipulate arms and use artificial respiration as in drowning cases. (See Drowning.) If revival ensue give stimulants—whiskey, spirits of ammonia, a teaspoonful of the former every few minutes, or twenty drops of the ammonia in a tablespoonful of water. An electric current from a home battery applied to spine and back part of the head is useful, before signs of life appear. Means for the recovery of one stricken with lightning should not be discontinued till at least an hour has elapsed after the visitation, as many supposedly fatal cases have been returned to life.

Lungs, Bleeding from.—See Hemorrhage of the Lungs.

Mining Accidents.—The Bureau of Mines at Washington, D. C., recommends a first aid organization in connection with all mines, such organization being composed of operatives and officials who shall study First Aid and carry on regular practice drills. The organization should be divided into squads or teams of six men each, including one captain, one patient and four stretcher bearers. Each squad should have the following equipment for use in practice drills and in cases of actual emergency: 12 triangular bandages, 12 medium size safety pins, 6 packages of gauze (plain or picric), 6 first aid outfits, 6 light wood or yucca splints 3½ inches wide by 18 inches long, 12 roller bandages, assorted sizes, 2 tourniquets, 2 rolls of cotton (plain or absorbent), 2 blankets, 1 stretcher, 6 wooden splints for legs and back fractures, 1 or 2 sets of first aid charts.

Moving of the Injured.—See Transportation of the Injured.

Poisons and their Antidotes.—See special alphabetically arranged article on this subject as per general index.

Pulse, the.—See "Sick Room Emergencies" (general index).

Powder Burns.—See Burns and Scalds.

Rabid Animals, Bites of.—See Dog Bites.

Railroad Accidents.—See Wounds.

Respiration, Artificial.—See Rescue from Drowning.

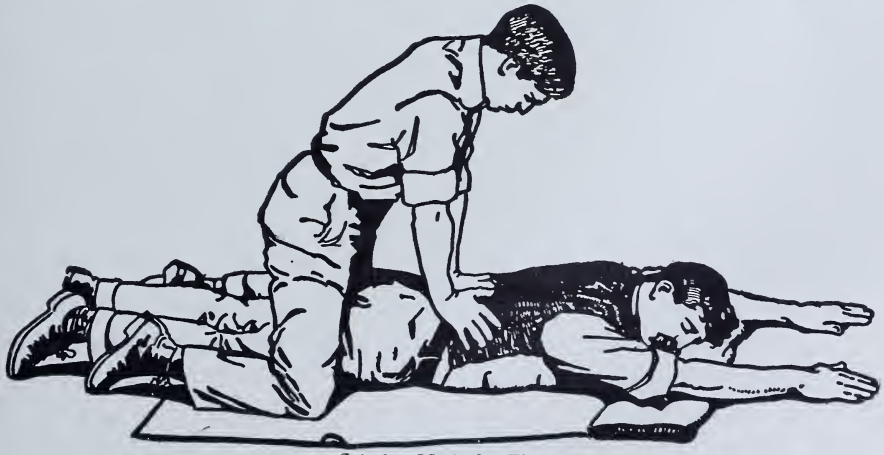
Rescue from Drowning.—Death from drowning is the result of asphyxia, due to the stoppage of a supply of fresh air to the lungs. No time should be lost in going to assistance of a drowning person, but none should attempt to go into the water themselves to rescue others unless they are capable swimmers and have understanding of proper methods of rescue. Before diving, boots and heavy clothing should be discarded if possible, and when a leap must be made from a height into waters whose depth is unknown, it is safer to drop in feet first. Where weeds are about, there is always danger of entanglement and great care is requisite. When approaching a drowning man, there is always danger of being clutched, but a swimmer who knows the right way can avoid this. It is a subject with which all swimmers should become thoroughly informed. When the apparently drowned person has been rescued from the water, no time should be lost in the commencement of endeavor to bring back respiration.

Treatment.—We shall first consider what we may call manual treatment, as differentiated from that of mechanical device, and afterwards refer to the latter. There are various methods of manual treatment, most of them requiring two persons, but the method which has now been recognized by the great life-saving bodies of the world as not only the easiest but the most efficient is that known as the Schafer or prone system, being the outcome of exhaustive investigations made by Prof. E. A. Schafer, Chairman of a Committee appointed by the Royal Medical and Chirurgical Society of England, and finally adopted by that Society in 1904. Professor Schafer describes the method as follows: Lay the subject face downwards on the ground, then, without stopping to remove clothing, the operator should at once place himself in position astride or at one side of the subject, facing his head and kneeling on one or both knees. He then places his hands flat over the lower part of the back (on the lower ribs), one on each side (Fig. 1), and then gradually throws the weight of his body forward on to them so as to produce firm pressure (Fig. 2), which must not be violent nor upon the patient's chest. By this means the air and water, if any, are driven out of the patient's lungs. Immediately thereafter the operator raises his body slowly so as to remove the pressure, but the hands are left in position and the movement of body again repeated. This forward and backward movement is repeated

every four or five seconds; in other words, the body of the operator is swayed slowly forward and backward upon the arms from twelve to fifteen times

Schafer Method.—Fig. 1.

a minute, and should be continued at least an hour, or until respirations are produced. Whilst one person is carrying on artificial respiration in this way, others may, if there be opportunity, busy themselves with applying hot flannels to the body and limbs, and hot bottles to the feet, but no attempt



Schafer Method.—Fig. 2.

should be made to remove the wet clothing or to give any restoratives by the mouth until natural breathing has recommenced.

It will be well to always bear in mind that an essential condition to

the success of artificial respiration is the keeping of the windpipe open so as to afford free access to the lungs. In asphyxiated persons the windpipe is obstructed by the contracted and retracted tongue and by the epiglottis. It is therefore essential that the tongue should always be drawn forward in the proper manner, and this must be done even if the mouth be closed and it be necessary to force it open in order to draw out the tongue.

When natural respiration is once established, the operator should cease to imitate the movements of breathing, and proceed with treatment for the promotion of warmth and circulation. Friction over the surface of the body must be at once resorted to, using handkerchiefs, flannels, etc., so as to propel the blood along the veins toward the heart, while the operator attends to the mouth, nose and throat. The friction along the legs, arms and body should all be toward the heart and should be continued after the patient has been wrapped in blankets or put into dry clothing. As soon as possible, the patient should be removed to the nearest house and further efforts made to promote warmth and proper circulation by the application of hot flannels to the pit of the stomach and hot water bottles, heated bricks, etc., to the armpits, between the thighs and to the soles of the feet. If there be pain or difficulty in breathing, apply a hot linseed meal poultice to the chest. On restoration to life, a teaspoonful of warm water should be given, and then if the power of swallowing has returned, very small quantities of warm brandy and water, beef tea or coffee should be administered, the patient kept in bed, and a disposition to sleep encouraged. The patient should be carefully watched for some time to see that breathing does not fail, and should any signs of failure appear, artificial respiration should be resumed. While the patient is in the house, care should be taken to have air circulate freely through the room and all overcrowding must be avoided. In all cases of apparent drowning physician should be sent for at once, but do not wait his coming to commence restoration, for each moment may count. There are cases on record where respiration has only been re-established after several hours of continuous effort.

Mechanical Device.—Resuscitation must usually depend upon manual effort, and everyone therefore should become thoroughly conversant with the instructions contained in the foregoing paragraphs. Yet it is evident that the work of resuscitation is mechanical, being simply a movement of the patient's body in such manner as to cause expansion and contraction of the lungs or in other words produce artificial respiration. This

being so it follows that if a mechanical device be truly adapted the requirements of the work will be done with greater regularity and more efficiency than is possible by manual effort. A machine of this nature has been devised. It is known as the Pulmotor and may be purchased from any dealer in surgical instruments. It is expensive and therefore cannot be an article of general household possession, but its value is so great when times of necessity come that every municipality should possess one and they should be found at all summer resorts, at all boathouses, and where financial conditions permit at all waterfront residences. Manual work, if properly done, is exhaustive and tiresome and there are very few who can continue it for any great length of time without cessation, yet the life of the patient depends upon the operation being carried on continuously and incessantly until natural breathing comes. The pulmotor is automatic and once started will keep up its work with continuity and may be superintended by a layman with as much capability as by a physician. It is simple of adjustment and automatically accommodates itself to the size and capacity of the patient's lungs, whether man, woman or child. Not only this, but the air administered is oxygenized some five per cent. above normal air, thus producing an especially vitalizing effect. In cases where limbs or ribs of the patient have been broken manual resuscitation is extremely difficult, sometimes impossible. With the pulmotor it may be carried on without danger to the patient. It may be used to advantage in all cases of asphyxiation, whether in the way of apparent drowning, electrical shock or gas, and may be used with infants who have not grasped the breath of life at birth yet who have animation within them. We have no brief for the manufacturers of the pulmotor nor for the surgical instrument dealers who sell them, but we consider it our duty to call the attention of the public to its undoubted worth that united action may ensue and one of the machines be secured for every municipality and kept on hand at all places where drowning accidents or asphyxiation from other causes are likely to occur.

Restoration of Circulation.—See Circulation, Restoration of.

Ribs, Fractures of.—See Fractures.

Scalds.—See Burns and Scalds.

Shock.—Accident, surgical operations, exposure to cold, sunstrokes, apoplectic attacks, asphyxia, poisoning and innumerable other ills are frequently followed by what is known as *Shock*. It is a more or less profound depression of the nervous system, and its onset is likely to be unnoticed unless looked for. Its detection and treatment are of great im-

portance and the subject well comes under consideration in dealing with Emergencies.

The patient either becomes stupid, showing no interest in what is taking place about him, or partial, in some cases complete, unconsciousness occurs. The breathing is feeble, the face pale, pinched and anxious, the eyes are dull and the pupils dilated, the pulse feeble, usually rapid and sometimes absent at the wrist, the skin is cold and there may be shivering; sometimes the mind wanders. These symptoms may follow a slight injury like a crushed finger, while on the other hand they may be absent, or only present in a slight degree, after the severest accident. The severity of the shock does not depend so much upon the nature or gravity of the injury or condition as upon the character and vitality of the individual. Usually, reaction takes place in a few hours, but in some cases there is no reaction, and the patient dies of heart failure.

Treatment.—Much can be done to relieve a person suffering from shock. Should shock occur while there is severe bleeding, such bleeding must be stopped, and any wound or fracture may receive a quick dressing, but no attempt to do more than this to the injury should be made until after attending to the shock. When shock comes after asphyxia, poisoning, or the like, the treatment for the shock may be given at the same time as the treatment for the primary condition.

The patient should lie in a horizontal position with the head slightly lowered. Give from a teaspoonful to a tablespoonful of whiskey or other alcoholic liquor in a tablespoonful of hot water. Administer this every ten minutes until five or six doses have been taken.

Cloths wrung out in hot water should be laid on the bared chest and abdomen and the patient covered with a blanket to keep in the heat. Hot water bottles, bricks, or the like should be placed along both sides of the body and legs, inside the thighs and under the armpits. In doing this, care must be exercised not to burn the patient. This danger may be obviated by wrapping hot water bottles, etc., in cloth sufficiently to give just the heat required.

Rub the body and limbs vigorously with the hand, or with hot, dry cloths.

One-half pint of equal parts of water and whiskey, heated to 110° F., should be given in form of a rectal injection.

Concentration throughout should be upon warming and stimulating the patient in every possible way.

Transportation of the Injured.

Artificial Respiration.—The Pulmotor.

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Snake Bites,—See Bites of Venomous Insects, Snakes, Reptiles, etc.

Splints.—See article on Fractures; also see general index.

Sprains.—Sprains are due to the violent twisting, stretching or partial tearing of the ligaments about a joint, and it sometimes happens, especially in sprains of the ankle, that there is at the same time a fracture of the ends of the bones. Unlike dislocations and fractures, sprains do not cause any deformity until swelling, which takes place very rapidly. There is always severe pain and any movement of the joint greatly increases the suffering. The most common sprain is that of the ankle, and its effects are so speedily manifested that in very few minutes, the patient may be unable to walk or even put his foot to the ground without great suffering.

Treatment.—Recovery from a sprain takes place slowly, and the serious mistake is often made of considering the injury trifling. Perfect rest is essential. The first thing is to reduce swelling and alleviate pain. The injured joint should be immediately placed in water as hot as can be borne, and this water should be kept continuously hot by constantly adding fresh hot water. Keep this up for an hour or longer. Or, instead of hot water, ice water cloths or an ice-bag may be held on the joint by a firm pressure bandage, which should be kept on for several hours. After the hot water or the ice treatment, cotton batting should be padded about the joint, and then bandaged with moderate firmness, using splints if desired. An affected ankle should be elevated above the hip. Cold applications of water, lead-water and laudanum, or of alcohol and water should be used for a day or two, after which hot fomentations and hot water bag afford more relief. When the pain and other acute symptoms have subsided, gentle motion and rubbing with liniments help to prevent stiffness. Time is lost by attempting to use the affected limb before it is sufficiently restored and great precaution should be taken in such regard.

Stings of Insects.—For the more common and less poisonous stings, such as those of the honey bee, wasp, etc., applications of washing or cooking soda, ammonia water, iodine or lead-water and laudanum, give relief. For stings of scorpions, large spiders and so forth, see Bites of Venomous Insects, Snakes, Reptiles, etc.

Stretchers for Carrying the Wounded or Injured.—See Transportation of the Injured.

Strains.—A strain is the wrenching or tearing of a muscle or tendon and is usually caused by violent exertion or sudden unexpected move-

ments. A strain generally occurs in the muscles or tendons of the arms or legs. The symptom is sudden, sharp, excruciating pain.

TREATMENT.—Let the injured person rest; bandage the injured part tightly or apply adhesive plaster. It is sometimes necessary to prevent movement of the part by splinting.

Stomach, Bleeding from.—See Hemorrhage of the Stomach.

Strangulated Hernia.—An accident that may happen to anyone having a rupture in the abdominal wall forming a small pouch into which a little loop of intestine escapes. If this intestine loop becomes crowded into the pouch in such manner as to be tightly squeezed, the bowels cannot act, and there is danger of mortification. This is termed strangulated hernia and is a very dangerous condition. It is accompanied by fecal vomiting and great pain and prostration. No time should be lost in securing the best medical skill that can be obtained. If the hernia cannot be reduced an operation is imperative and is attended by small risk in hands of a skilful surgeon. Pending arrival of physician, the patient should be placed on his back with the foot of the bed elevated. The legs should be drawn up toward the abdomen and warm applications made to the rupture.

Stunning.—See Concussion of the Brain.

Suffocation.—See treatment in Rescue of the Drowning.

Sunstroke.—See Heatstroke.

Torn-off Limbs.—See Wounds.

Tourniquet.—See as to making and using with Hemorrhages.

Transportation of the Injured.—Never move a seriously injured person if avoidable. When necessary proceed in such manner as to cause least possible suffering and danger as to results. By unskilful handling sharp ends of a broken bone may be thrust through the flesh, or may cut into an artery, or bleeding of a wound may be started afresh. Every little bit of strength which the patient may lose through pain during transit, lessens the chance of recovery and may turn the scale on the side of death. The dangers to life from a broken leg, for example, when the skin is not cut through, are more than doubled, if, by ignorant handling, with the kindest intentions in the world, the affected limb is allowed to swing downward for a single instant so that some sharp splinter of bone penetrates the skin, and makes the injury a compound fracture. When moving is necessary, first examine for possible fractures and apply splints, etc. Then, if possible, place the injured person on a stretcher which may be improvised from boards, doors, shutters, etc., or if nothing of this

kind at hand, may be made with two poles and a couple of coats. The sleeves of the coats are first turned inside out. The coats are then placed on the ground with their lower sides touching each other. The poles are passed through the sleeves on each side and the coats are buttoned up with the button sides down. A piece of carpet, a blanket, or sacking can be used in much the same way as the coats, rolling in a portion at each side and firmly fastening by cords or otherwise so that there can be no danger of giving away under the weight of the patient. In the woods, two poles about ten feet long, kept apart by forked sticks about a foot in length, tied in place with rope, twine or leather straps, or even some climbing plant, and covered with clothing, form a very good litter.

In placing an injured person on a stretcher the work can be most safely done by three persons. There are two modes of operation, one in respect of patients who have a broken limb and the other as to cases where there is internal or bodily injury. In either case place the stretcher at the patient's head on a line with the body, the foot of the stretcher being nearest the patient's head. When it is a case of broken limb, one bearer kneels on each side of the patient and the two join hands underneath his hips and shoulders, the third man attending to the wounded limb or looking after any bandages or splints that may have been applied. The bearers then rise to their feet, raising the patient in a horizontal position, and by a series of side steps bring the patient over the stretcher, when he is lowered gently and made as comfortable as possible. In cases where there is internal injury or the body is affected, the three bearers should stand in a row on the injured side of and facing the patient. Each bearer then kneels on the knee nearest the patient's feet, with the knee towards the patient's head raised so as to form a kind of bench. They now put their hands under the patient and at the command "Lift" gently raise him to their knees. At the command "Rise" they rise to their feet and gently turn the patient so as to face against their breasts. They may walk either by stepping forward or by sidestepping, the patient then being lowered upon the stretcher by bending again to the knee position just described. The tallest of the bearers places himself between the handles at the head of the patient and one of the others at the foot, the third member devoting himself to the patient by guarding any injured part. The bearer at the head starts out with the left foot and the other with the right —were they to keep step the stretcher would roll badly. The patient is carried feet first except in going upstairs or up a hill, when he is carried head first.

If there is plenty of assistance at hand, let the acting surgeon of the party take charge of the wounded limb, and devote himself, after giving the necessary instructions to an acting assistant surgeon chosen on the instant, to protecting that injured member in every way. Next, let four persons, under direction of the assistant surgeon, lift the sufferer by his hips and shoulders, two others supporting the head and feet, as may be necessary, and when raised to a sufficient height, let two others, still, slide the prepared litter under the patient as he is held up in the air by his seven bearers. He can then be gently deposited upon the litter, having undergone the least amount of disturbance possible under the circumstances.

If alone with an individual so severely wounded as to be helpless, the best way often is to make him as comfortable as possible, see that there is no danger of serious bleeding, leave him some weapon with which to defend himself, and hasten for the nearest assistance which can be procured.

Carrying the Litter.—The litter should be carried by two persons, whilst the acting surgeon walks by the side and keeps a constant watch over the patient. The following rules should be observed: First, the litter should be carried with the hands, or supported by straps passing over the bearers shoulders. The litter itself should never be placed upon the shoulders of the bearers, because the patient might then fall off, or even die from hemorrhage or other cause without his danger being observed. The patient is carried feet first except in going up stairs or up a hill, when he is carried head first.

Bearers not to keep step.—Second, the bearers should not keep step. If they keep pace, as in marching, the litter shakes from side to side, and the patient is apt to roll about, or even to be thrown to the ground. To prevent this, the bearers must walk in broken step—that is, not putting the right foot, for example, forward at the same moment—and then the litter remains nearly even as it is borne along.

Pace of the Bearers.—Third, the pace of the bearers should be short, not more than twenty inches, and the steps made without any spring on lifting the foot from the ground. All jolting, all hurried movements and lifting over fences, ditches, and so forth, are to be avoided. Send some one ahead, if practicable, to look out for gates, bridges, and similar advantages, which are very important in the transportation of the sick and wounded, and let him come back and guide the bearers in the easiest path to the place of destination.

Bearers of Same Height.—Fourth, if it can be done, choose bearers of the same height, and should it be impracticable to do this, arrange the shoulder-straps in such a way that the litter will hang as level as possible. Fifth, in ascending an inclination, such as hill or staircase, the patient's head must be in front, and in descending it should be behind. If, however, the invalid has a broken leg, this rule must be reversed; otherwise the weight of the body would press upon the injured part, and, perhaps, aggravate the trouble. Sixth, the patient should usually be removed from the litter in the same manner as he was placed upon it.

In Absence of a Litter.—Should neither a litter nor material out of which one can be made present itself on careful search, the wounded man must be supported in the arms, which of course can only be done as a general thing for short distances. If there is only one person at hand to help, and if the injured man can walk, though weak and faint from loss of blood, he must put one arm around the neck of the individual aiding him so that his hand hangs down over the further shoulder. The person assisting places his arm from behind around the waist of the wounded man, and with his other hand grasps that of the patient as it hangs over his shoulder. In this mode he can support him very efficiently, and if necessary even raise him from the ground for a few steps over difficult places, and so help him along. Should the patient, however, be unable to walk, the only resource is for the person helping him either to take him on his back, or, if not too heavy, to carry him in his arms like a child. In either case the wounded person should clasp his arms around the neck of the bearer.

Bed for Accident Patient.—The preparation of the bed for a patient who is the subject of a severe accident is a matter of no little importance. The couch intended for the reception of an accident case, wounded about the legs or hips, should be provided with a large sheet of water-proof material and an extra sheet folded and placed across the bed, so that it can be readily removed when soiled with blood or other discharges without disturbing the head and shoulders of the patient. If the mattress is likely to yield to any extent with the weight placed upon it, it should be supported with extra slats. In case of wounds about the head, the pillow ought to be protected by a piece of extra sheeting.

Undressing the Patient.—A patient who is not too much injured to endure the effort should always be undressed before being placed in the bed. All tight clothing about the neck should at once be loosened or altogether removed. Boots must be taken off with great care.

Case of Broken Leg.—If the leg is broken it is better to cut the boot down the side and nearly to the toe. Pantaloons need not be cut, unless the patient's leg or thigh is injured, in which case the outside seam ought to be ripped up, so as to get them off without causing suffering to the invalid. In taking off the coat and waistcoat always remove them from the sound side first, and then they come away from that which is injured with comparatively little difficulty.

Unloading the Litter.—When a patient who is unable to walk is brought in on a litter or stretcher of any kind, such as a window-shutter or door, the litter should be placed with its head at the foot of the bed which the invalid is to occupy, and lying in the same direction, this position being the most convenient one for transferring the sick man to his couch. To properly lift an adult patient four assistants are required, two standing on either side. One of these helpers should support the head and shoulders, and a second the hips on one side, whilst on the other side the third assistant lifts the back, and the fourth supports the legs. In some cases the size or arrangement of the room will not permit this.

Placing the Patient Abed.—The litter must then be laid alongside of the bed, and three assistants lifting the patient into the air, a fourth rapidly withdraws the litter to allow the bearers to approach the side of the bed and deposit the invalid upon it. All the assistants should commence to lift together, and set down the patient at a given signal, special attention being devoted to the injured limb. The bed-clothes should be folded back for the whole length of the bed on one side, leaving one-half of the bed laterally uncovered for the reception of the patient. By this little maneuver they are easily replaced over a frame of wire, or of two half hoops tied together in their centres, in such a way as to protect the wounded limb from the weight of the bed covering.

There are a number of other ways of carrying an injured person. Where the patient is in condition to permit, the "chair" method may be adopted. Two persons join hands thus: Each of the two grasps his own right wrist with his left hand, back uppermost. Then each grasps his companion's left wrist with his right hand. This forms a chair. The patient sits on this support, at the same time putting his arms around the necks of the bearers to steady himself. When the patient is unable to sit in such a chair, one bearer standing behind the patient passes his arms under the patient's arms and clasps hands over his chest. The other bearer stands between the legs, his back turned toward the patient and passes his arms beneath the knees from the outside. The patient may now be

lifted and carried. It is sometimes necessary for one person to carry another without aid, as from a burning building, etc. The method recommended by the Boy Scouts of America is to turn the one to be carried on his face, step astride his body, facing toward the patient's head, and with hands under his armpits lift him to his knees; then clasping hands over the abdomen lift him to his feet, then with the left hand seize the patient by the left wrist and draw his left arm around your neck and hold it against your left chest, the patient's left side resting against your body and support him with your right arm about his waist. Then with your left hand seize the right wrist of the patient and draw the arm over your head and down upon your shoulder, then shifting yourself in front stoop and clasp the right thigh with your right arm passed between the patient's legs, your right hand seizing the patient's right wrist; lastly with your left hand grasp the patient's left hand and steady it against your side while you rise, and the patient will lie over your shoulder like a sack and so may be carried.

A simpler way if there is a chair at hand is to hold the patient in the chair while you place your shoulder against his abdomen; then throw the arm belonging to that shoulder around him and rise to your feet with his body hanging over your shoulder like a meal sack, his head and shoulders hanging down behind while his legs are in front. Only one hand is used and the other is therefore free for use in descending a ladder or for any other purpose. This latter method is recommended by the New York City Society for First Aid to the Injured.

For other methods see general index.

Unconsciousness.—Insensibility or unconsciousness may result from so many different causes that even the most skilled physicians often find it difficult to determine its origin. The following general procedure is recommended.

1. Send for medical assistance.

2. Lay patient on his back. Loosen all tight clothing about neck, chest and waist which might interfere with flow of blood to and from the head. If face is then red or flushed raise head and shoulders. Lay cloths dipped in cold water on the head. *Never give stimulants when the face is flushed.* If the face is pale do not raise the head but see that it is on level with the body. In all cases the head should be turned a little to one side to prevent tongue falling back, vomit matter being drawn into lungs, etc., and to insure free breathing.

3. Get all the information possible. The person may have had a fall

or a blow, may be wounded, suffocated, drunk, have had heatstroke, be suffering from uræmic coma or any one of many ills. Enquire as to whether patient fell suddenly, had convulsions, complained of illness, had been under conditions to cause heatstroke and make other pertinent queries.

4. Compare the two sides of the body for evidence of paralysis or fracture. Open eyes and observe whether pupils contract when exposed to light and whether they are of same size, large or small. Count pulse, note respiration, whether slow, irregular, quiet or snoring. Notice the odor of the breath and whether the skin is hot or cold to the touch.

Information such as outlined may help you to decide as to what the unconsciousness is due and enable you to act if the coming of physician be delayed. In any event it will be valuable to the doctor when he arrives, as symptoms may have changed in the meantime, and it may be important to him to know what the earlier symptoms were. (See Hysterical Unconsciousness and Uræmic Coma.

Unconsciousness, Hysterical.—See Hysterical Unconsciousness.

Uræmic Coma and Convulsions.—Unconsciousness may be due to presence of impurity in the blood resulting from disordered action of the kidneys. In such cases there is usually a strong smell of urine about the person affected, and if there be convulsions and there are signs of dropsical swellings about the legs and eyes, this condition should be had well in mind. Treatment should be left to the physician. In his absence give a cathartic, as castor oil or epsom salts if the patient can swallow—a hot water and soap enema if he cannot swallow—and surround him with hot blankets and bottles to induce sweating, being careful not to burn him.

Varicose Veins.—See Hemorrhage of Varicose Veins.

Vapors, Apparent Death from.—See Gas Poisoning.

Wounds.—It is of first importance in dealing with wounds to have a clear idea of the principle of *Asepsis.*

Asepsis means the absence of living germs. Germs are bodies so small that of some kinds it would take 1,500 to stretch across the head of a pin. They procreate with marvelous rapidity. There are innumerable varieties. They are present on the surfaces of everything, even on those that appear cleanest and brightest, though more abundant where there is dirt. They are always present on the skin of the body, in the mouth, throat, stomach and intestines, in water, and are carried in the dust in the air. Most of these germs are harmless to man, in fact they are neces-

sary to his existence. Comparatively few germs are what are known as disease germs, such as those of diphtheria, tuberculosis, etc., and these are not present everywhere but only in the bodies of and discharges from persons or animals suffering from such diseases. The germs of decomposition, however, are almost everywhere present. Without them the earth would be covered with dead animal and vegetable matter, for it is these germs of decay which transform dead matter into substances which plant life uses in its growth. Ordinarily we are protected against these germs of decomposition by the unbroken skin, through which they cannot pass, but when they get into a wound they begin at once to multiply and exercise their power of producing decomposition. Irritation of the wound, inflammation, pus and delay in healing are natural consequences. Not only this, but other varieties of germs may find their way into wounds and set up blood poisoning. In a person with healthy body, and if but a small number of germs enter the wound, the healthy cells and fluids of the blood and tissues may destroy the intruders before they accomplish harm, yet the danger exists with even the most healthy. Germs in an open wound, where they may be washed away by discharges, are less dangerous than those in a closed wound where discharge is prevented. Thus a small wound contaminated with germs and then dried up or covered with sticking plaster may prove much more dangerous than quite a large wound which remains open.

As asepsis means the absence of germs, so a wound is said to be aseptic when there are no living germs in it. An aseptic wound, if properly closed, will quickly heal without inflammation or pus. The wonderful development and success of modern surgery is due to this knowledge of asepsis and the power to make wounds aseptic. Formerly inflammation and pus were invariable accompaniments of large wounds, because the principle of asepsis was unknown. To-day a wound with inflammation and pus is said to be infected or septic, which is the opposite of aseptic.

When things are aseptic they are said to be surgically clean, which is therefore different from ordinary cleanliness. The usual way of making things surgically clean is to thoroughly boil them in water. An article that has been well boiled and then kept from exposure is surgically clean and will not cause disease or blood poisoning. You may pick up a dirty knife off the street and, after boiling it for half an hour, use it immediately with safety in an operation, while if you took a knife from your kitchen and used it without boiling or otherwise making aseptic, the

wound would be sure to be infected by germs. Things treated in this way by boiling are said to be sterilized. This knowledge is of paramount importance in first aid work, because it enables anyone to use whatever material be at hand with almost perfect safety, by sterilizing it. It will be evident that a fresh wound should not be touched by the hands or any unsterilized object or instrument when this can be avoided. Fresh towels, handkerchiefs and sheets that have been boiled in the washing are usually surgically clean, and this also is true of running water. However, it is always safer in connection with wounds to use dressings that have been properly sterilized and water that has been boiled.

Wounds may be operative—that is, made by a surgeon in operation —or they may be accidental. In operative wounds aseptic principles are religiously adhered to, instruments and dressings are made absolutely aseptic, the surgeon wears aseptic apron and in spite of the most scrupulous care as to the cleanliness of his hands, he usually wears rubber gloves which have been specially sterilized for the operation. In the case of accidental wounds, however, there is almost always more or less contamination and therefore it rarely happens that an accidental wound is surgically clean. It is with accidental wounds that we have here to deal.

At one time it was believed that wounds should be thoroughly washed and cleaned at once, but it has been learned in different ways, and especially in modern warfare, that as a rule accidental wounds do best if simply immediately covered with a sterile dressing and kept at rest without handling or washing until the patient can be handed over to the care of the surgeon. Many of the germs that may have entered the wound are washed out by bleeding and the few that are left may be destroyed by the healing powers of the tissues themselves. Any attempt of an unskilled person to wash and clean a fresh wound may result in introducing more germs than are removed.

It sometimes happens, however, that a wound is so grossly contaminated by earth or other matter as to demand cleansing before it reaches surgeon's hands. In such cases water should be sterilized by boiling and poured into the wound from a little height. Or peroxide of hydrogen may be used freely in such a wound. Such antiseptics as carbolic acid and bichloride of mercury are usually unsafe except in skilled hands. Before touching any wound or instruments or materials to be used about the wound, thoroughly wash the hands with soap and cleanse the nails with brush and piece of clean wood, rinse in hot water and dry on fresh towel, after which touch nothing with the hands excepting the wound,

when necessary, and dressings, etc., for it. An exception, of course, is that of severe hemorrhage where the first necessity is to stop the flow of blood. The following general emergency rules, then, may be adopted in respect of the immediate treatment of accidental wounds:

1. If wound is bleeding severely, treat as described under Hemorrhage.

2. If wound is not bleeding severely, take a piece of sterilized gauze or cotton of the cleanest material obtainable, and simply wipe away any blood or loose clots on the surface. If the wound gapes open, draw the edges together as well as possible, using pieces of the same material to do this, and avoid touching the wound with the fingers. Then place over the wound a good-sized pad of the same material and bandage it firmly with a handkerchief or other convenient bandage. Where no surgical help is obtainable this dressing may remain on the wound until it heals, unless it discharges or becomes painful, in which case the dressings should be changed every day or oftener and the wound washed by pouring sterilized water over it or freely using peroxide of hydrogen.

Sterilized dressings and emergency necessities should be kept in every home, house, shop, factory or camp and carried by those who travel. They can be bought very cheaply at any drug store and take up little room.

Extraction of poison by sucking is highly commendable when possible. "Cupping" also may sometimes be employed to advantage (see Cupping).

Wounds, Healing of.—Wounds may heal by what is known as *first intention* or *primary union*—that is, when asepsis or freedom from germs has been obtained and preserved, resulting in that the wound quickly heals and leaves but little scar. But if a wound does not heal by first intention, then it comes under the slow process of *second intention*—that is, with formation of granulations—and finally leaves a large scar. Second intention is in evidence when the skin has been destroyed over such area that the edges cannot be brought together, when the wound is disturbed, when blood collects in it, forcing it apart, or when the wound is dirty—that is, when asepsis has not been preserved. Contused and lacerated wounds generally heal by second intention.

Wounds, Contused and Lacerated.—These are wounds which have ragged edges and the skin and soft parts are torn and bruised. These occur in accidents where instead of a clean cut there is a tearing or crushing of the tissues. Railway, machinery and such like accidents are frequently of this character. Treat as for general Wounds, but it is to be

borne in mind that such wounds are frequently followed by Shock, and this should be looked for.

Wounds, Poisoned.—Dissection wound is a term applied not only to wounds received by medical students and surgeons in their dissections, but to wounds sometimes received by butchers, cooks and fish-dealers, who handle putrefying animal matter. Such wounds are particularly virulent. A wound of this character should be thoroughly washed, and the blood squeezed out of it. If a puncture, it should be freely opened and swabbed with pure carbolic acid, then washed with bichloride of mercury solution, and wet antiseptic dressing applied. Bites by animals should be so treated, the human bite being one of the worst.

Wounds, Punctured.—Wounds made by sharp instruments (such as a dagger, a splinter, a fork prong, and so forth) have especial dangers, and require radical treatment. Foreign bodies are frequently left at the depth of such a narrow wound; the opening is small and readily closes, locking up infective material; underlying organs of the abdomen, head or chest are liable to injury. Such wounds generally demand the attention of the skilled surgeon. He will usually probe for a foreign body and will generally open the wound to its depth, often incising it freely, in order to disinfect it properly and to allow for drainage. He will determine whether underlying organs are injured and any treatment needed for such.

Wounds, Gun-shot.—The special dangers to be combated in gun-shot wounds are shock, hemorrhage and infection. Injury of vital organs is liable. In many cases it is better not to probe for a bullet. The ball should be searched for when it has surely carried in with it foreign bodies; when it is in a vital organ, as the brain; and when its presence interferes with healing.

Wounds, Crushed Feet, Hands, etc.—Displaced tissue should be put back and the injured member made to assume as nearly as possible its original shape by carefully moulding it with the hands, using as little force as possible and endeavoring not to cause excess of pain. Then wrap in warm sterilized gauze or cloth and cover the whole warmly with cotton, wool or a blanket. If a long bone is fractured in a crushed wound, a splint should be applied over the dressing before moving the patient.

Wounds, Torn-off Limbs.—If a foot, hand or finger is torn off, the stump should be considered as a lacerated wound and so treated.

Wounds with Protrusion of Internal Organs.—In cases of chest and abdomen wounds where internal organs are protruding, for instance, the

bowels, it is generally unwise for anyone but a surgeon to attempt to replace them. They should be covered with a warm, moist, sterilized cloth until the surgeon arrives. If, however, no doctor can be obtained, the protruding part may be gently cleansed with warm, sterilized water and replaced, a sterilized compress being bandaged over the external wound. Be on lookout for symptoms of shock. If symptoms of shock are present they require as careful attention as the wound itself.

Wounds, Infected.—Contaminated wounds may become red, swollen and very painful and give rise to fever. This is proof of the presence of germs and all dressings must be removed, the wound opened if necessary, thoroughly washed out with peroxide of hydrogen or sterilized water, and dressed every few hours with wet, sterilized compresses. Such cases should always be under a physician's care and those who are unskilled should not attempt to treat excepting in cases where it is impossible to secure medical assistance.

Wounds, Incised.—See Cuts.

PART II OF BOOK V

Describes the different kinds of bandages and the manner in which they are applied.

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Fig. 3.—Simple Spiral Bandage applied over splint.

Fig. 4.—Simple Spiral Bandage.

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Fig. 5.—Posterior Splint for fracture of the forearm.

Fig. 6.—Anterior Splint for fracture of the forearm.

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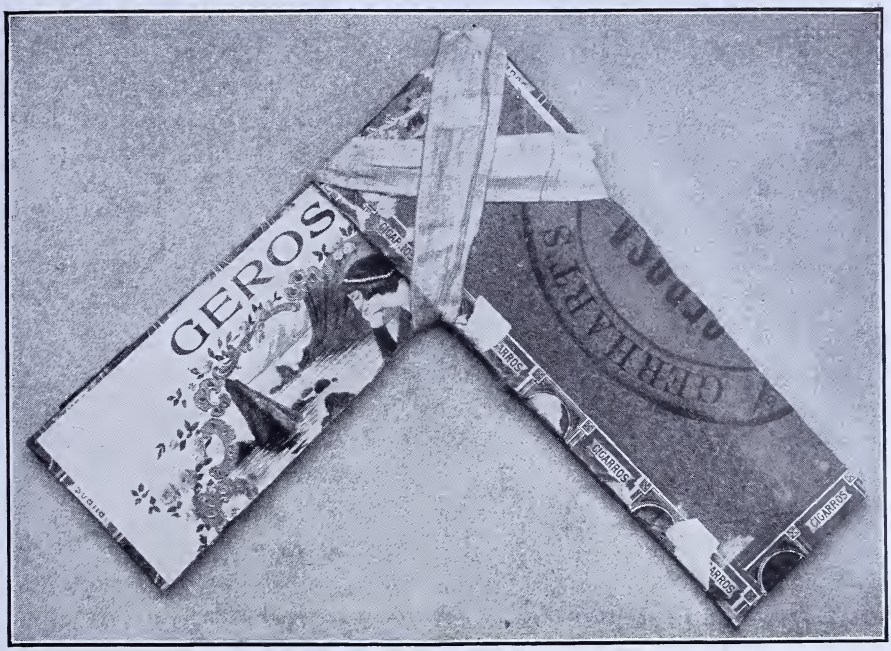

Fig. 7.—Emergency Splint made from cigar-box lid for fracture of ankle.

Fig. 8.—Cigar-box Splint applied to fracture of ankle.

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Fig. 9.—Fracture of knee-cap held in place with adhesive plaster and a board.

Fig. 10.—Spiral Reverse Bandage for the arm.

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Fig. 15.—Double Handkerchief Sling.

Fig. 16.—Coat Sleeve Sling.

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Fig. 17.—First stage of applying Head Bandage.

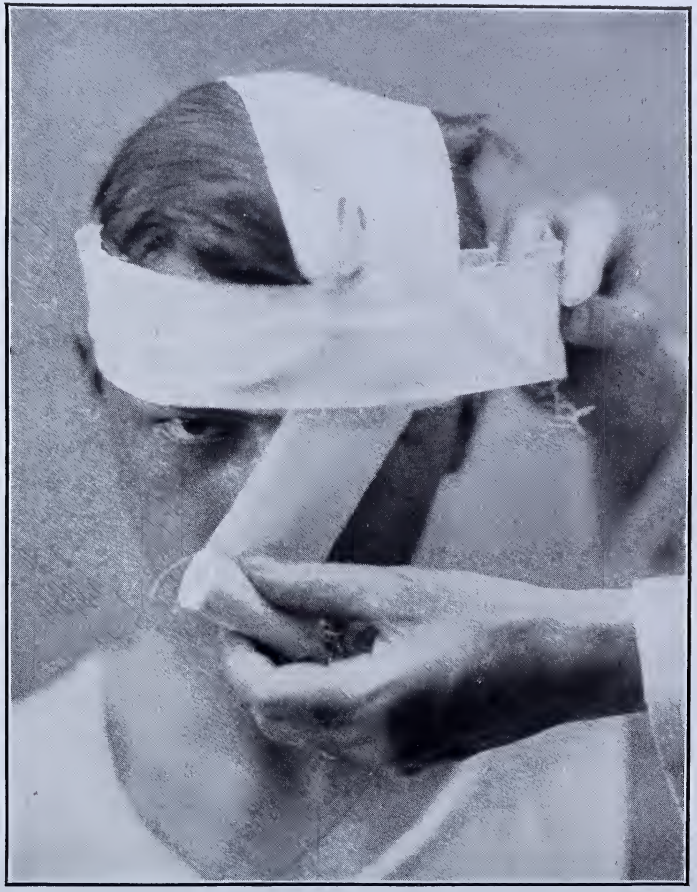

Fig. 18.—Second stage of applying Head Bandage.

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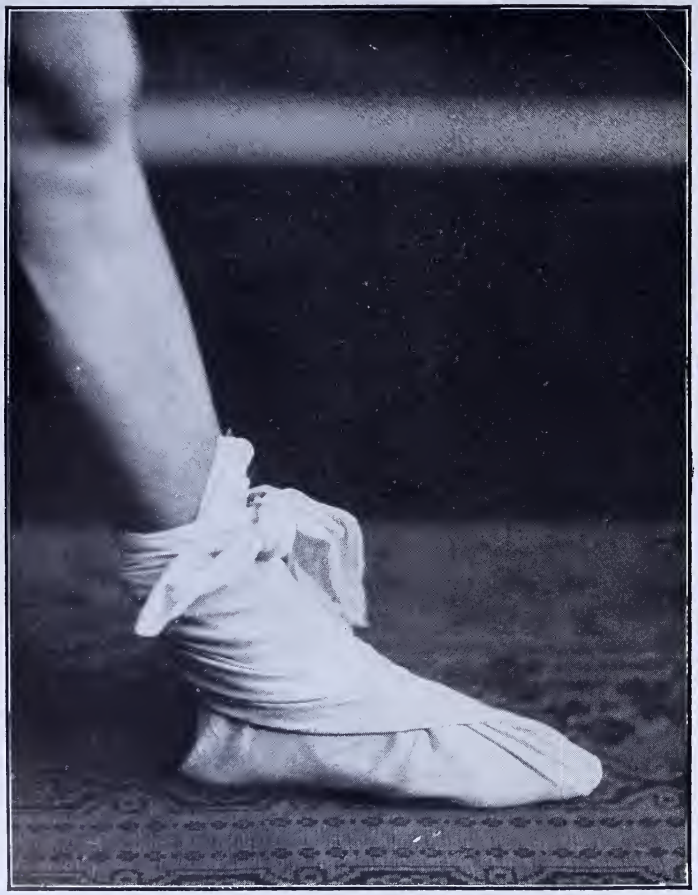

Fig. 19.—Triangular Bandage applied to foot.

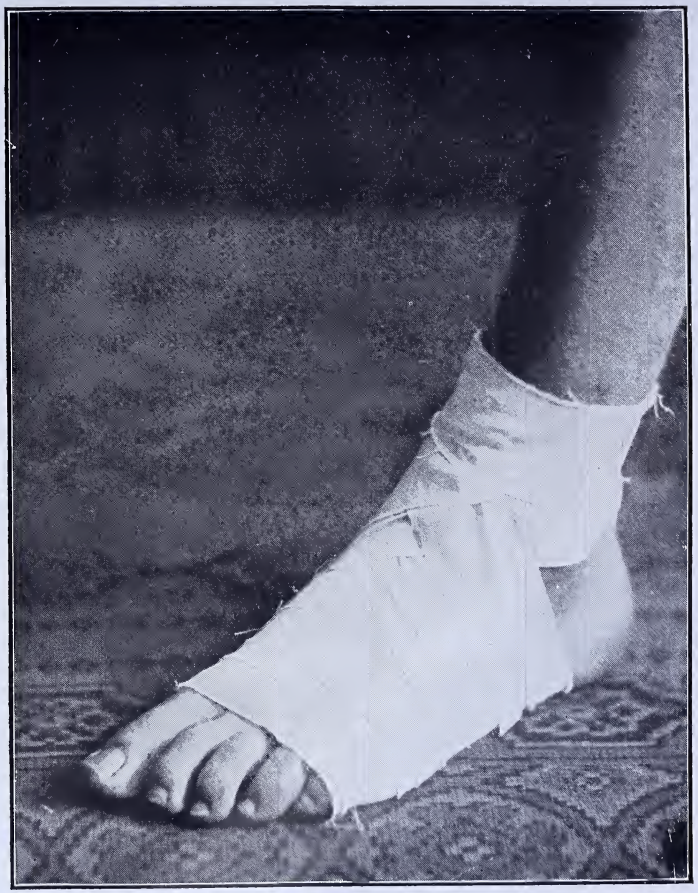

Fig. 20.—Simple bandage for foot and ankle.

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Fig. 21.—Triangular Bandage as a Sling.

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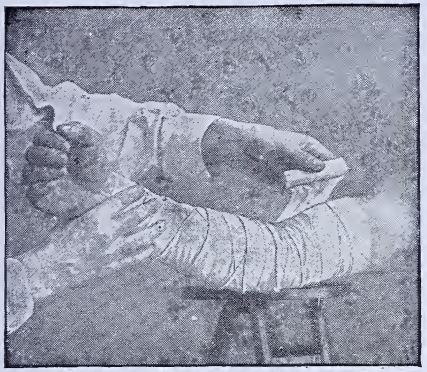

Fig. 26.—Bandage used in case of a burn on front part of hand, wrist or forearm.

Fig. 27.—Bandage used in case of a burn on back of hand, wrist or forearm.

Fig. 28.—Bandage used for fractured kneecap and steadying joint motion.

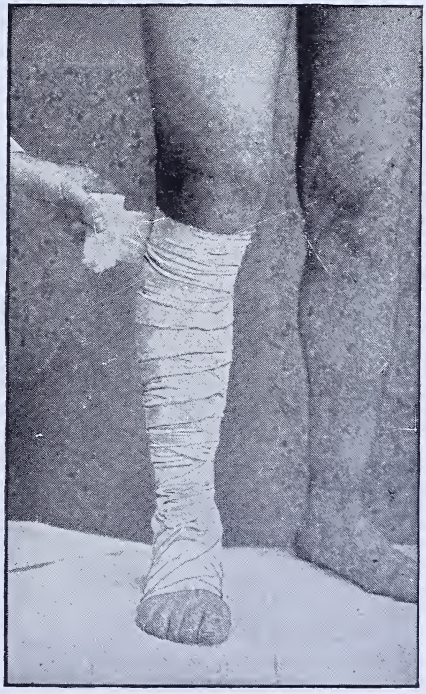

Fig. 29.—Bandage used in case of a serious wound on lower part of the leg.

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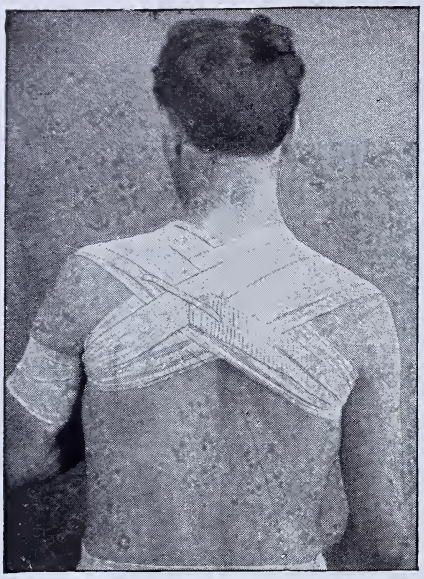

Fig. 30.—Bandage used to fix the shoulders back in case of a burn on breast, or broken collar bone.

Fig. 31.—Bandage for serious injury to the eye, to retain dressing and exclude light.

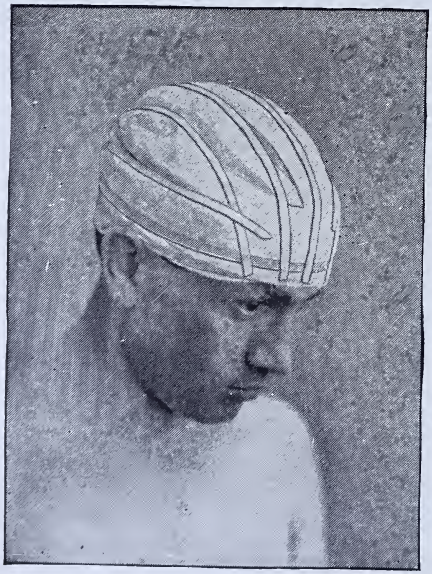

Fig. 32.—Simple and effective bandage for dressing wounds of the scalp, or any injury of the top or sides of the head.

Fig. 33.—Bandage for fractured collar bone, so applied that it cannot be removed by a restless patient.

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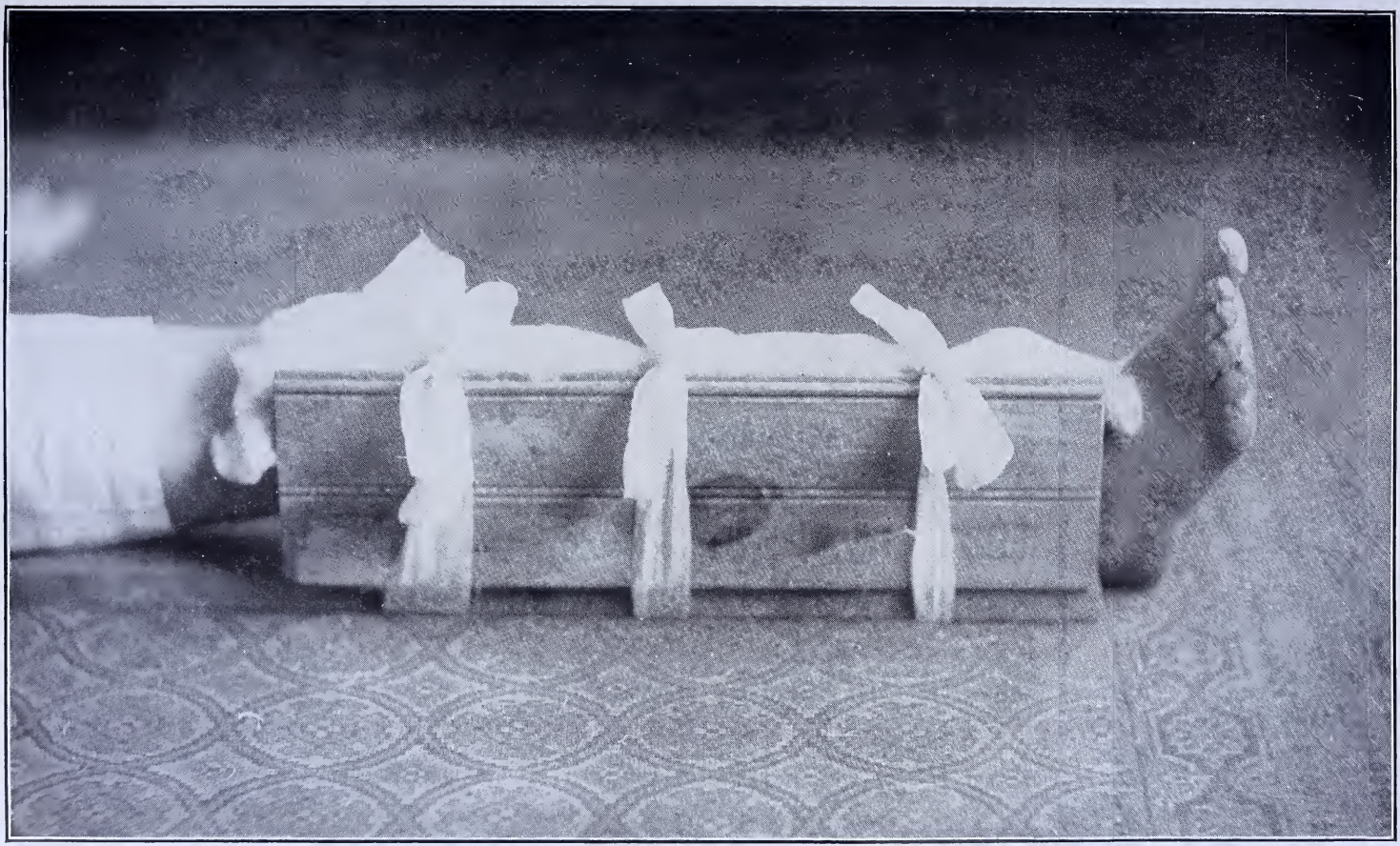

Fig. 34.—Board used as Emergency Splint for fracture below the knee.

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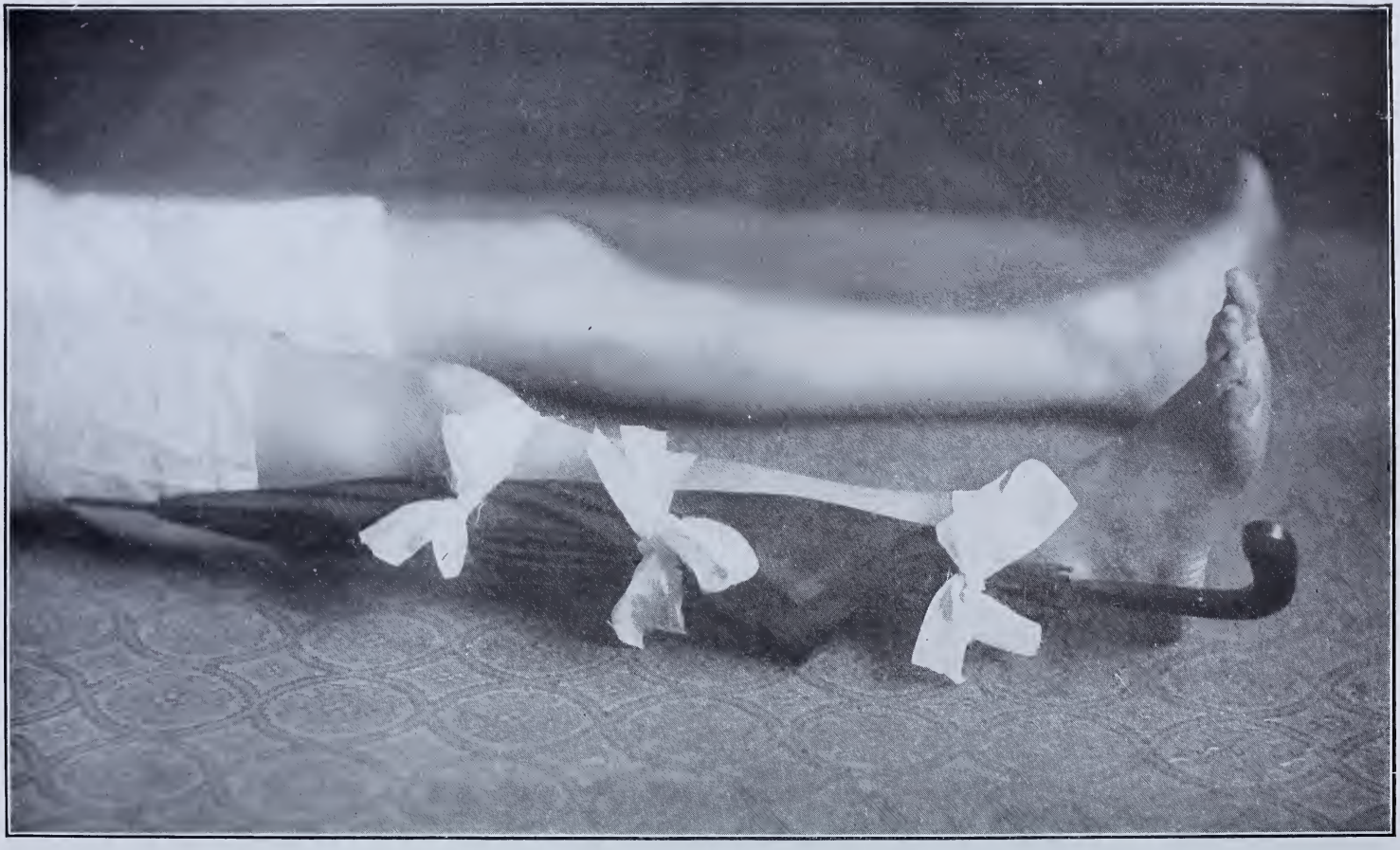

Fig. 35.—Umbrella used as Emergency Splint for fracture below knee.

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ACCIDENTS AND EMERGENCIES

PART II.

BANDAGING.

While this article on bandaging is primarily intended to give knowledge especially applicable in cases of accident, and the illustrations are chiefly in respect of emergencies, and therefore do not show that decision of arrangement which would naturally be followed in the operating-room, yet both the article and its illustrations will be found applicable in the sick room.

Bandages may be made of gauze, cotton, flannel, rubber, muslin, etc. They are used to hold splints or other dressings in place, to give support, to make compressions, and to correct deformity. When desirable to have a part absolutely rigid, starch, silicate of sodium, plaster-of-paris or like material may be incorporated in the bandage.

There are many different kinds of bandages. They are named from their shape, use, mode of application, from a fancied resemblance to something, or from the name of their inventors. It is not intended to here give details in respect of every class of bandage. It would only be confusing. It is purposed, however, to give such particulars and illustrations as will enable the layman to apply bandages in all cases requiring such treatment.

A stock of bandages and cloths for emergencies should be kept always on hand in every home. Bandages and all dressings for wounds should be absorbent to admit of ready impregnation with medicines and to allow of the absorption of discharges. They should be thoroughly sterilized and kept in clean paper and not removed until required for use.

The Roller Bandage (Fig. 1) is usually made of gauze or unbleached muslin which has been washed in soda solution to remove the sizing and then torn into strips varying from one to five inches in width and from three to ten yards long, according to the part to be bandaged. Roller bandages may be purchased

Figure No. 1.

in any drug store in sizes of all lengths and widths. When the bandage is made at home care should be taken that the edges be kept true, the loose threads picked off and the end of the bandage secured by a pin.

The T Bandage is made by sewing one piece of bandage at right angles to another, is used to retain dressing between the thighs. One part of the bandage is tied around the waist, the stem of the T passing between the legs, then being brought up and tied to the first part.

The Many-tailed Bandage is used principally after abdominal operations. On applying it the central portion is placed over the spine, and beginning at the top, the first tail on one side, then the first tail on the opposite side is brought across the abdomen, so alternating and overlapping until all the tails are used.

The Recurrent Bandage is applied to various parts. To adjust it to the head make several turns around the head, then pass the bandage backward and forward over the scalp until the parts are covered. Secure the turns with pins or strips of adhesive plaster.

Fig. 2.

The Oblique Bandage is begun by several circular turns and is then carried up the limbs like the red band on a barber pole. It is rarely used.

The Spiral Bandage is applied to parts which do not vary in circumference. It is applied like the oblique except that the turns overlap each other. Figure 4 demonstrates the application of the spiral bandage to the hand and wrist.

The Spiral Reversed Bandage (Figs. 2 and 10) is applied to parts which are conical. It is begun like the spiral, but as the legs begin to

thicken it will be found that the lower edge of the bandage does not lie snugly against the limb. In order to obviate this reverse each turn of the bandage, *i. e.,* the upper edge of the bandage becomes the lower edge. Overlap each preceding turn of the bandage at least one-half.

To confine the bandage the end should be folded on itself, the corners again folded under and a pin should be passed in the direction from which the end of the bandage has come.

The Figure of Eight Bandage is applied to the knee, elbow, chest, axilla and occiput. Make several circular turns around the limb to fasten, pass obliquely downward over the flexor side of the joint to the opposite side, make a circular turn below the joint, and pass obliquely up again. The figure of eight is repeated, overlapping the turns until the part is covered.

Figure 11 shows an excellent method of binding up the hand and wrist by means of a folded handkerchief in times of emergency. Care shoudld be taken not to allow any tight constriction around the wrist for a prolonged period, as death of the fingers may result.

Figure No. 11.

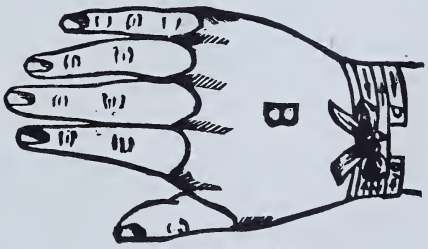

Figure No. 12.

Bandages on the hand may be kept in place by use of a glove with the fingers cut off as shown in Fig. No. 12 and such a glove may also be used in keeping wounds clean and in other advantageous ways.

The Spica Bandage is a figure of eight bandage, each turn overlapping the previous one so as to resemble a spike of barley. When the turns overlap each other from below upward the bandage is called an ascending spica; when from above downward, a descending spica. When the turns cross in front it is termed an anterior spica; in back, a posterior spica; and on the side, a lateral spica; when two corresponding parts like the groin are covered, the bandage is known as a double spica.

The Four-tailed Bandage is made by taking a square or oblong piece of flannel or muslin, and tearing toward the centre from opposite sides,

so as to make four tails. The size depends on the size of the part to be covered.

For the instep make the bandage about twenty inches long and about five inches wide. Double it and tear down the centre, leaving a square portion untorn. Apply it by placing the central square portion across the instep; bring the two upper ends up around the leg and tie them; the lower ends are to be brought about the lower part of the foot and tied in a similar manner. This bandage is very effective in confining dressings to the instep and lower part of the leg. It may also be applied to the heel.

Figure No. 13.

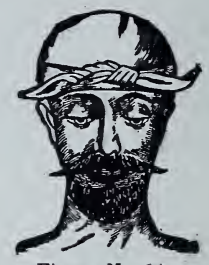

Figure No. 14.

For the knee take a strip of muslin eight inches wide and about thirty inches long; tear each end down the middle to within six inches of the centre. Apply the central portion over the patella, bring the upper ends of the bandage around behind the knee, passing obliquely downward, and tie on the front of the leg below the knee-pan; the lower ends should be crossed behind in a similar manner, and tied on the front of the thigh above the knee-pan.

Figure 13 shows the four-tailed bandage applied to the chin.

The Triangular Bandage by skillful manipulation has been made to perform many and varied offices.

Figure 14 shows the ordinary triangular bandage applied to the scalp in a manner somewhat like that adopted by women to protect the hair from dust when sweeping.

Figure 23 shows the triangular sling applied in the usual way, the weight being supported by both shoulders.

In Figure 22 the same bandage is depicted, except that the weight of the forearm falls on the left shoulder.

In applying the triangular bandage to the knee take a triangle of muslin, the base being about two feet long and the apex about ten inches from the base. Place the centre of the base across the front of the knee just above the knee-pan; bring the ends around as many times as possible and tie them. Dressings are easily held on by this method, and much support is given in cases of fracture of the knee-pan.

The Fillet or Head Band.—Take a piece of flannel twenty-five to thirty inches long and about ten inches wide. At the centre of the band-

Figure No. 22.

Figure No. 23.

dage, one-half inch from the lower edge, cut a triangular hole large enough for the nose. Stand behind the patient and place the bandage over the face, the nose projecting through the hole, the remainder of the upper part of the face being covered. The ends are brought together behind and pinned. This is an admirable dressing for retaining dressings on the face and eyes, especially in burns of the face.

Bandage for the Chin.—This bandage should be one and a half inches wide and about nine yards long. Standing at the back of the patient the end of the bandage is placed just over the left eyebrow, and fastened by one horizontal turn around the head, then passing around to and below the right ear, underneath the chin, and upward over the left side of the face, just covering the left ear. Two more turns are to be made over the top of the head and underneath the chin, each turn including a little more of the anterior part of the chin. The bandage is now to be continued around behind the neck, and, in a slanting direction, over the head and around the forehead, as before, and then again below the right

ear and across the front of the chin and around the neck, drawing this part quite snug, and repeating; then passing under the chin and up on the left side of the face, bring the bandage to the top of the head and confine by several turns. It is used for fracture of the lower jaw, and for holding poultices to the side of the face, and so forth. If any turns be made about the neck care should be taken that they are not drawn tight enough to interfere with the circulation.

T-Bandage for the Temple.—Take two pieces of muslin, one two to four inches wide and three feet long; ten to twelve inches from one end, at right angles to it, another bandage should be fastened, two inches wide

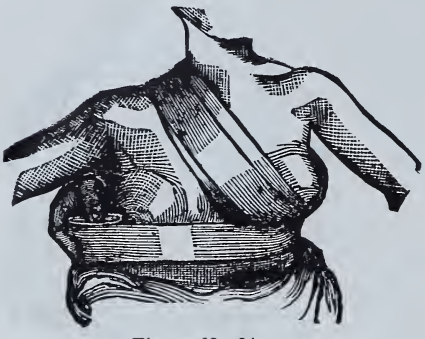

Figure No. 24.

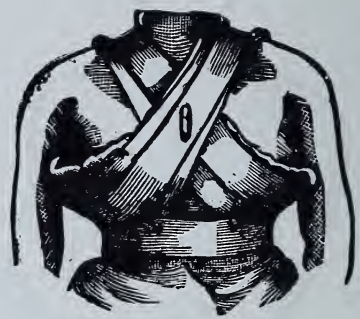

Figure No. 25.

and seven to eight feet long, one end only extending fifteen to eighteen inches beyond the point of junction.

Place the point of junction of the bandage over the injured temple in such a manner that the wide part of the bandage is perpendicular as regards the head; the short end is to be brought to the top of the head and the long end around under the chin and fastened to the opposite end. The narrow part of the bandage is now carried around the head horizontally, the short end being confined by the horizontal turns.

Double T-Bandage for the Nose.—Take a muslin bandage seven to eight feet long and one inch wide. At the centre of this, about one inch from each other, and at right angles to the first, stitch two other strips each two and one-half feet long by three-quarters of an inch wide.

Place the centre of the main bandage beneath the nose (the two shorter pieces passing up on each side, crossing at its base and resting on the top of the head), carry the ends around to the back of the head where they cross and are again brought around to the forehead, where they may

be confined after taking several circular turns about the head. The ends passing over the top of the head may pass down behind and be pinned to the main bandage. This bandage is of use in keeping dressings about the nose in position.

Bandages for the Breast.—We will assume the left breast is to be supported. It is first covered with a layer of cotton; then applying the end of the bandage about the centre of the back, holding it in place with one hand and with the other bringing the roller under the arm and breast, then across the chest and over the right shoulder, then under the arm and breast again until it is covered; the bandage should now pass across the chest at the level of the lower end of the breast-bone, below the opposite breast, and around behind, where it may be confined. (See Figure 24.)

When both breasts are to be supported the bandage should pass across the left shoulder also and below the right breast in the same manner. (See Figure 25.)

PART III OF BOOK V

Treats of the poisons and their antidotes, giving a list of poisons and antidotes for quick reference.

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FIRST AID TO THE INJURED

PART III.

POISONS AND THEIR ANTIDOTES.

How Poisons Enter the System.—Under the head of poisons, it is intended to include all those substances which exercise pernicious, as distinguished from medicinal, effects upon the human body, tending to disturb its action or organization injuriously, and if not remedied to possibly cause death. Such substances may be swallowed, or taken in by the breath, absorbed through the skin, or the thinner and more delicate mucous membranes, or implanted by bites, stings, or other punctured wounds.

Symptoms of Poison.—In many cases persons are aware almost immediately after the act that they have swallowed a poison; but in many others, also, no suspicion is entertained at first. In a general way, it may be stated that it is reasonable to surmise a person has swallowed some poisonous substance, if, shortly after taking food or drink, he is seized with violent pain in the stomach, with vomiting and purging, especially if convulsions or paralysis are present, or if the individual suffer from marked giddiness or delirium, or should there be a great tendency to sleep. The first thing to do is to send for the nearest reputable physician, and any neglect of this involves a heavy responsibility if the illness prove mortal, as it is certainly very possible that it will do.

Never Lose a Moment.—In the meantime not a moment should be lost. There are three rules which should always guide an effort to remedy the effect of poison, no matter what it may be: First, to get rid of the poison; second, to stop its effects; and, third, to remedy the evil it has done. In carrying out the principles thus inculcated, whatever is readiest is best; for the poorest remedy given at the moment, is better than the most appropriate, administered an hour later.

Effect of Some Poisons.—A considerable number of poisons are what might be called self-evacuating; that is, having been swallowed, they set up vomiting and purging, and are thereby eliminated. In such cases, all that is needful is to aid the self-evacuating process, especially to assist the vomiting, and so, perhaps, get rid of the poison altogether. If vomiting, however, has not occurred, or has not been profuse, the first thing is to bring it on immediately.

The Mustard Emetic.—The three handy emetics are, usually, mustard, common or kitchen salt, and lukewarm water. If we have a choice, mustard should be used in poisoning where the noxious substance has had a sedative influence, and it is less applicable to those cases where an irritant effect has been produced.

Mustard Dose.—The dose of mustard is a tablespoonful, stirred up in a pint of warm, not hot, water, and, after drinking it, the patient should swallow as much warm water as his stomach will hold, both to dilute the poison and to promote the action of the mustard. After a few minutes, if no signs of vomiting appear, the back of the throat ought to be tickled with a feather, or roll of paper, which will often hasten the emetic effect. When the stomach has emptied itself, it is well to repeat the process, so as to give it a good washing out.

Salt Water Dose.—Should there be no mustard at hand, salt water, mixed in the proportion of a small handful to a pint of lukewarm fluid, and followed by copious draughts of the warm fluid, as before suggested, and tickling the throat if needful, will generally answer the purpose. It is a good plan to send at once to the nearest drug store for some wine of ipecacuanha, to be administered in tablespoonful doses every ten minutes, should the ordinary home remedies fail in their customary energetic effect.

Need of an Antidote.—In some instances, this treatment is all that is required, but frequently the simple plan of getting rid of the poison will not suffice. Its effects must be neutralized or remedied, or, in other words, some antidote is needed. No one antidote is suited to all emergencies. The antidote is required to be adapted to the poison, and therefore an effort should be made, instantly after the emetic is given, to find out what kind of a noxious substance has been swallowed, and the proper remedy should be administered in accordance with the following suggestions.

Object of an Antidote.—The object of most antidotes is to render the active poison an inert substance, after which treatment may be instituted with a view to remedy the mischief which it has previously done. Antidotes, therefore, are generally chemical agents, which attack or combine with the poison in such a way as to render it insoluble, and so inert. But some are medicines, the virtues of which are apparently opposed to the active qualities of the poison, constituting what may be correctly called counter-poisons.

Milk and Eggs.—If we are totally ignorant of the kind of poison which has been swallowed, as may occasionally happen, the treatment

Alphabetical Table of Principal Poisons With Antidotes for Immediate Use.

A case of poisoning is the mightiest of emergencies—one of life or death. Every minute counts. One must know what to fly to on the instant. Here the poisons are arranged alphabetically so as to be found in a second, and followed by their quickest and most effective antidotes at hand in the home.

POISONS	ANTIDOTES
ABSINTHE.	Give an active emetic; then flaxseed tea freely; stimulate.
ACETATE OF LEAD.	Same as SUGAR OF LEAD.
ACETIC ACID.	Same as CITRIC ACID.
ALCOHOL.	Treat by emetics, hartshorn and external warmth.
ALKALI, VOLATILE.	Drink freely of water with vinegar or lemon juice in it.
AMMONIA.	Lemon juice, diluted vinegar or acetic acid.
ANTIMONIAL WINE.	Give warm water freely to encourage vomiting.
ANTIMONY.	Same as TARTAR EMETIC.
AQUA FORTIS.	Magnesia or soap dissolved in water, every two minutes.
ARSENIC.	Give prompt emetic of mustard and salt—tablespoonful of each. Follow with sweet oil, butter or milk.
BED BUG POISON.	Give milk or white of eggs in large quantities.
BELLADONNA.	Active emetic; stimulate.
BITTER ALMONDS.	Same as PEACH KERNELS.
BLUE VITRIOL.	Same as SULPHURIC ACID.
CANTHARIDES.	Evacuate stomach; give mild drinks.
CARBOLIC ACID.	Give flour and water, or other glutinous drinks.
CARBONATE OF SODA.	Prompt emetic; soap or mucilaginous drinks.
CAUSTIC POTASH.	Drink freely of water with vinegar or lemon juice in it.
CAUSTIC SODA.	Drink freely of water, with vinegar or lemon juice in it.
CHEESE.	Same as MILK.
CHLORAL HYDRATE.	Cold water on head and face; artificial respiration; galvanic battery.
CHLORIDE OF LIME.	Give acids; evacuate bowels; stimulate.
CHLOROFORM.	Emetic of tablespoonful of mustard in warm water. Follow with stimulating treatment.
CITRIC ACID.	Chalk or magesia water; flaxseed tea; lime water.
COAL GAS.	See GAS.
COBALT.	Prompt emetic; soap or mucilaginous drinks.
COPPERAS.	Prompt emetic; soap or mucilaginous drinks.
CORROSIVE SUBLIMATE.	Milk or white of eggs, freely. Emetic.
CREOSOTE.	Starch or flour mixed with water; or white of eggs and milk; or evacuate stomach with an emetic.
DIGITALIS.	Evacuate; lie prone; stimulate.
ERGOT.	Evacuate; give purgatives; stimulate.
ETHER.	See CHLOROFORM.
FISH.	Emetic, followed by saline purgatives and alkaline drinks; or promptly evacuate stomach and bowels, and then stimulate.
FOWLER'S SOLUTION.	Prompt emetic of mustard and salt—tablespoonful of each. Follow with sweet oil, butter or milk.
GAS.	Remove patient to air, use artificial respiration, apply heat to extremities; send for doctor.
HAIR OF CATERPILLAR.	Apply cloths saturated with camphor. Don't rub.
HONEY, POISONOUS.	Black coffee, smell of camphor, and rub with same.
ICE CREAM.	Same as MILK.
IODINE.	Starch, flour, or arrowroot, mixed with water.
IVY, POISON.	Same as SUMACH.
JIMSON WEED.	Prompt emetic of mustard and salt—tablespoonful of each to pint of warm water, then stimulate with coffee or brandy.

NOTE.—In most cases of poisoning vomiting should be excited at once. The common emetics are mustard, a tablespoonful to a pint of warm water; salt, a small handful to a pint of warm water; warm water itself, in copious draughts. Salt and mustard mixed, a tablespoonful of each to a pint of warm water, make a quick and powerful emetic. Should an emetic prove tardy, tickling the throat with a feather will help to promote vomiting.

POISONS ANTIDOTES

LAUDANUM.—Strong coffee, followed by ground mustard or grease in warm water to produce vomiting; keep in motion.

LEAD WATER.—Milk or white of eggs in large quantities.

LEAD, WHITE, RED, LITHARGE.—Prompt mustard or salt emetic, then castor oil; heat to bowels.

LIME.—Vinegar or lemon juice, then starch water.

LUNAR CAUSTIC.—A strong brine of salt; then milk and sweet or castor oil.

LYE.—Give vinegar or oil.

MAD-DOG BITE.—Tie band tightly around limb above wound; cut out and cauterize wound; apply antiseptic dressing; give purgative and warm drinks; send to Pasteur Institute.

MATCHES.—See PHOSPHORUS.

MEATS, PUTREFIED.—Emetic, followed with vinegar or lemon juice.

MERCURY.—White of eggs freely; afterwards evacuate; mild drinks.

MILK.—Cleanse stomach and bowels; apply heat; stimulate.

MORPHINE.—Strong coffee, followed by ground mustard or grease in warm water to produce vomiting; keep in motion.

MURIATIC ACID.—Magnesia or soap dissolved in water, every two minutes.

MUSHROOMS.—Same as TOADSTOOLS.

NICOTINE.—Same as TOBACCO.

NIGHTSHADE.—Same as BELLADONNA.

NITRATE OF SILVER.—Give common salt in water, freely.

NITRE.—An emetic, then drinks of barley water, followed with castor oil.

NITRIC ACID.—Same as AQUA FORTIS.

NUX VOMICA.—Same as STRYCHNIA.

OAK, POISON.—Same as SUMACH.

OIL OF VITRIOL.—Same as SULPHURIC ACID.

OPIUM.—Same as LAUDANUM.

OXALIC ACID.—Magnesia or soap dissolved in water, every two minutes.

PARIS GREEN.—Same as ARSENIC.

PEACH KERNELS.—Spirits of hartshorn, strong coffee; cold applications.

PHOSPHORUS.—Excite vomiting, then give milk and magnesia, followed by tea of flaxseed or slippery elm.

PINK ROOT.—Coffee without milk, smell of camphor.

POKE ROOT AND BERRY.—Evacuate stomach and bowels; stimulate.

POTASH.—See CAUSTIC POTASH.

POISONS ANTIDOTES

POTASSA, BICARBONATE.—Magnesia or soap dissolved in water, every two minutes.

PRUSSIC ACID.—Coffee in plenty and quickly; smell spirits of ammonia, camphor or vinegar, pour water on head and back. Death generally ensues so quickly that there is no time for emetics.

RAT PASTE.—Quick emetic of salt and mustard, then flaxseed tea freely.

RED PRECIPITATE.—Milk or white of eggs in large quantities.

SALTPETRE.—Milk or white of eggs in large quantities.

SNAKE BITES, POISON.—Tie band around limb above bite; suck out venom with mouth; cauterize wound; give strong stimulants.

SODA.—See CAUSTIC SODA.

SPANISH FLY.—Same as CANTHARIDES.

STINGS.—Apply salt water, or sweet oil, or fresh mould. Always take out the sting of a bee.

STRYCHNIA.—Emetic of mustard in warm water.

SUGAR OF LEAD.—Milk or white of eggs in large quantities.

SULPHATE OR CHLORIDE OF ZINC.—Solution of soda, milk, white of eggs.

SULPHURIC ACID.—Prompt use of magnesia, soap, chalk or lime water. Afterwards mucilage water or milk.

SUMACH.—Apply to parts a paste of equal parts of starch and glycerine.

TANSY.—Evacuate stomach; stimulate; artificial respiration.

TARTAR EMETIC.—Drink warm water freely to encourage vomiting.

TARTARIC ACID.—Soap water, lime water, magnesia or chalk.

TIN.—White of eggs and milk, or sugar water.

TOADSTOOLS.—Evacuate stomach and bowels; give Epsom salts; stimulate.

TOBACCO.—Encourage vomiting with salt and mustard water, then stimulate with spirits of ammonia or whiskey and water.

TURPENTINE.—Fresh air, flaxseed or slippery elm tea.

VERDIGRIS.—Same as COPPERAS.

VERMILION.—Milk or white of eggs in large quantities.

WHITE PRECIPITATE.—Prompt emetic of mustard and salt—tablespoonful of each. Follow with sweet oil, butter or milk.

WHITE VITRIOL.—Same as SULPHATE OF ZINC.

is first to provoke vomiting, as already advised, and after the stomach is completely emptied, to give a moderate quantity of some bland liquid, such as milk, eggs beaten up with milk, or sweet oil.

Wine and Brandy.—If the patient feels cold, and the skin is cool and clammy, a little wine or brandy well diluted may be administered; and if he seems drowsy, narcotic poisoning is to be suspected, so that strong coffee, and belladonna under the direction of a physician, should be employed.

Hot Water and Mustard.—If the prostration is very great, stimulants freely, heat to the skin by hot-water bags or bottles, and mustard plasters to the abdomen, are to be resorted to.

When the poison taken into the stomach is known, and prompt attempts have been made to eject it by vomiting, then administer its antidote.

Elimination by Vomiting.—Theoretically the administration of the chemical antidote is the only requisite, the vomiting, with its accompanying discomfort and depression, being uncalled for; but it is safer to eliminate the poison or what part of it can be removed by vomiting, and so take as few chances as possible upon the quality and efficacy of the drug used as an antidote. Chemical results obtained in the laboratory are not always confirmed when the same combinations are attempted within the human system.

Classification of Poisons.—To facilitate the study of the subject some system of management should be adopted. No classifications of poisons is entirely satisfactory, and the following is offered as probably as good as any other for public use:

1. Gases and volatile substances.
2. Metals.
3. Minerals and metallic salts.
4. Corrosive poisons, acids and alkalies.
5. Vegetable poisons, in form of drugs.
6. Vegetable poisons in natural state.
7. Bacterial and food poisons.
8. Animal secretions.

GASES AND VOLATILE SUBSTANCES.

Illuminating Gas.—In the process of manufacture of illuminating gas from coal but little, if any, injury is done the workmen, owing to the distillation of its more deadly constituents in retorts.

In its distribution its escape from imperfect pipe connections and collection in trenches, sewers and houses occasionally causes poisonings and explosions. Illuminating gas known as water-gas is much more deadly and much more dangerous on account of its presence being less easily detected by smell.

On animal organism both forms act as a narcotic and depressant of the nervous system; uniting with that portion of the blood normally taking up the oxygen and displacing the oxygen.

Symptoms.—These depend upon amount of poison absorbed. When poisoning occurs gradually there is discomfort, sense of fullness of blood-vessels, headache, dizziness, hot skin, weakness. There may be nausea, vomiting and convulsions. Coma occurs, which, in some cases of recovery, may last for days; it may precede death but a few hours, or it may continue for days before a fatal termination takes place.

Treatment.—Removal of the patient to the open air; the use of artificial respiration, and the application of heat to the extremities are about all that can be done before the arrival of a physician. Artificial respiration hastens the expulsion of the poison and its substitution by oxygen. This result may be effected more promptly by inhalation of commercial oxygen. Nitro-glycerine and amyl nitrite might be used with advantage.

Aniline.—This is made from coal tar, a biproduct in the manufacture of illuminating gas. It is an oily, colorless liquid, but its poisonous effects are chiefly caused by its volatility. The vapor produces headache, dizziness, marked depression, nausea, vomiting. Delirium and convulsions may occur.

Treatment should be same as for illuminating gas poisoning.

Bromine.—This in its commercial form is a red fluid, but to the fumes arising from it when pouring, etc., is to be ascribed nearly all cases of bromine poisoning. Bromine vapor causes irritation of the respiratory organs, cough, spasm of the opening into the larynx and suffocation. It also causes increased flow of tears and saliva and bronchial asthma.

Treatment.—Inhalation of aqueous vapor.

Carbon Bisulphide.—This is a colorless volatile liquid that causes poisoning chiefly by the vapor arising from it. It is used very largely in the manufacture of rubber goods; has a very offensive odor. Acute cases of poisoning do not occur, except where the substance is used for suicidal purposes, when the symptoms are pallor, vomiting, depression, deep, heavy breathing, characteristic odor of breath, feces and urine.

Carbon Dioxide.—This is the poisonous gas sometimes met with in wells, cisterns, etc. It is the "after damp" of the coal mines. Its deleterious effects and treatment are similar to those of illuminating gas. It will not support flame.

Chlorine.—This is a gas of peculiar odor; is used chiefly as a bleaching agent. The public is familiar with it as a disinfectant in the form of chloride of lime, made by allowing pure slaked lime to take up all the chlorine gas it will absorb. It is a strong irritant to the respiratory tract. Continued exposure to it produces skin eruptions, inflamed eyes, asthma and bronchitis.

Chloroform.—This has been taken as a liquid by accident and intention. In this form its poisonous effects do not occur so soon as when the vapor alone is absorbed.

One teaspoonful has been known to have brought death to a boy of four years. Twelve times this amount killed an adult. Several adults have recovered after swallowing sixteen teaspoonfuls.

Treatment.—1. Empty the stomach by giving a tablespoonful of wine of ipecac, or a tablespoonful of mustard in warm water. Twenty grains of sulphate of zinc or thirty grains of powdered ipecac may be given in warm water for the same purpose. A hypodermic injection of one-tenth grain of hydrochlorate of apomorphine and use of the stomach tube are very effective measures to remove the poison from the stomach.

2. Stimulating treatment must be used extensively, as, for instance, brisk switching, or towel slapping or flicking; hot external applications; injection of hot strong coffee into the rectum, pint at a time; application of mustard plaster to calves and legs and over the heart; hypodermic injections of ether and hot brandy, atropine, strychnia and digitalis; use of the interrupted current by sweeping poles over the surface of the body; placing victim with his head lower than his body that the brain might be supplied with blood with the least possible effort of the heart.

Even though apparently there is no response to treatment efforts at resuscitation should be continued for a comparatively long time, as recoveries have occurred at the end of an hour of continuous effort.

Chloroform.—Chloroform taken into the lungs in form of vapor is supposed to act more promptly than when taken into the stomach as a liquid. In this form there is a wider range between the smallest quantity producing death and the largest amount taken without fatal result. Records show that less than half a teaspoonful mixed with air and administered by a competent person for surgical purposes has caused death,

on the other hand, a woman suffering with convulsions following childbirth (post-partum eclampsia) has been kept under the influence of chloroform vapor for seventy hours continuously.

Symptoms.—The symptoms of poisoning by inhalation of the vapor are similar to those following taking the drug in liquid form into the stomach.

Treatment.—1. The treatment differs only in refraining from any attempts at the production of vomiting or emptying the stomach by use of stomach pump. Equally applicable to both forms of poisoning are the following aids to resuscitation, not previously mentioned: Prompt commencement of artificial respiration. The occasional inhalation of amyl nitrite. The measure advocated in the following quotation might be of some avail.

2. "When the patient seems to be in extremis a couple or more violent blows on the chest quickly given may restore the action of the heart."

3. **Electric Treatment.**—Regarding the use of the interrupting current as an aid to recovery authorities differ in details of application. One advocates placing one pole of the battery at the pit of the stomach and the other at the region of the larynx, with the idea of stimulating the phrenic nerve, which causes the diaphragm to act and aid respiration. Another authority states this method is dangerous, because nerves (cardiac inhibitory nerves) which tend to slow or stop the action of the heart lie so near the phrenic nerve that it is impossible to stimulate the latter without exciting the former to action, and so defeating instead of promoting recovery; hence the previously mentioned method of sweeping the poles of the battery over the surface of the body.

Chronic Chloroform Poisoning.—Chronic chloroform poisoning is a condition the existence of which would not be readily suspected. It occurs among a class of people who use chloroform constantly, for the same purposes or reasons that the other type of inebriate uses alcohol. Although the path to ruin and death is probably more direct by the chloroform than the alcohol method, yet that the former is occasionally comparatively long is shown by the record of a woman dying at the age of forty-two in a chloroform stupor, who for at least ten years had taken by inhalation a pint of chloroform daily.

Ether is a colorless volatile liquid. It is highly inflammable, and when taken by the mouth imparts a burning taste. It is not so dangerous a drug as chloroform when used by inhalation and probably not when

taken in liquid form. Although less apt to cause death, it has greater tendency to produce diseases of the respiratory tract than chloroform when taken by inhalation.

Symptoms of Ether Poisoning.—The symptoms and treatment of poisoning by ether are similar to those of chloroform, except the use of ether hypodermically as a stimulant should not be permitted.

When in poisoning by ether the face becomes cyanotic, flushed, the failure to breathe properly is not due to weakness of the heart but to respiratory trouble, and the head should not be placed lower than the body. When the poisonous effects are carried beyond the cyanotic stage pallor succeeds the same as in chloroform poisoning and indicates lowering the head below the body in the same way as the latter drug.

Treatment.—Traction upon the tongue, simulating normal respiration in frequency, duration, regularity and evenness is a method of causing recovery that is equally applicable to both ether and chloroform poisoning.

Amyl Nitrite.—This is a product of the chemical combination of amylic alcohol and nitric and nitrous acids. It is a clear volatile liquid having an aromatic penetrating odor. For administration by the public it is prepared in small glass receptacles called pearls, resembling some forms of capsules, and containing from three to five drops. The pearl is broken in a handkerchief and the contents inhaled.

Symptoms of Amyl Poisoning.—An excessive amount causes alarming prostration, very rapid and tumultous beating of the heart, difficult respiration, bursting sensation in the head and roaring in the ears. Recovery is said to have occurred after taking one-third of an ounce. With the exception of prussic acid amyl nitrate is the quickest of all nervous depressants.

Treatment.—Artificial respiration. Hypodermic injection of strychnia and atropine. Give digitalis and whiskey. Apply heat in form of hot water in bottles or rubber bags if required

Ammonia.—See Corrosive Poisons.

Nitro-benzine.—This is a yellow liquid formed in the manufacture of anilene by adding nitric acid to benzine. It has the odor of bitter almonds and has been used to perfume soaps. It is a subtle, dangerous poison both as a liquid and vapor.

Symptoms.—Inhalation of a poisonous amount is followed by appearances of slow intoxication except the mind remains clear until a period of insensibility is reached. Insensibility may occur with great suddenness,

may be delayed for several hours and may continue for several hours before death occurs.

There is an odor of bitter almonds upon the breath.

Treatment.—If the liquid has been taken empty the stomach with a pump or by emetics. If the poison has been inhaled, or taken into the stomach apply heat. Use strychnia and general stimulating treatment.

Turpentine and white lead instead of white lead and oil are largely used for painting interior, and so forth. It is claimed by the painter and the physician, and denied by the employer, that the use of turpentine in confined places, such as between decks, causes watery discharges from the nose, a feeling of fullness or stuffiness in the head, difficult urination and bloody urine.

Treatment.—Recovery follows exposure to the fresh air and use of mild bland drinks such as tea made from slippery elm or flaxseed. There is no record of the occurrence of any fatalities. Taken into the stomach in excessive amounts turpentine produces the same symptoms of strangury and bloody urine caused by inhalation of its vapors. In addition it may cause inflammation of the kidneys, stomach and intestines.

Iodine in its process of manufacture and manipulation volatilizes at ordinary temperature. In its liberation from seaweed it gives off fumes in the same way as chlorine and bromine in their process of extraction. Its vapors cause the same effects as those of chlorine and bromine. For poisoning resulting from its use in drug form, see Minerals, Metallic Salts.

Prussic Acid.—This colorless, transparent, inflammable, volatile liquid is perhaps the most rapid and deadly of poisons. Taken in sufficient quantity is has been claimed to have caused almost instant death.

Symptoms.—These vary with the quantity of poison taken. When not sufficient to be promptly fatal there may be open, staring eyes, fixed jaws, pallor of cyanosis, depending upon whether the cardiac or respiratory functions are the more affected, convulsions, vomiting, unconscious discharge of feces, urine and semen. The odor of bitter almonds is noticeable upon the breath and upon post-mortem examination, but rapidly disappears.

Treatment.—This is, of course, confined to those cases that afford time for action and may be outlined as use of stomach pumps, artificial respiration, oxygen inhalation, cold applications to head and spine, electricity, ammonia by inhalation or intravenously.

Sulphurous Acid.—This is a strong solution of sulphurous oxide gas. Its poisonous effects are directed chiefly against the respiratory tract.

Remedies.—The remedies are fresh air, artificial respiration and stimulants.

Nitrous Oxide.—This is known also as nitrogen monoxide, and laughing gas is used chiefly as a brief anesthetic in dentistry. It is capable of producing alarming symptoms and even death by respiratory paralysis. Recovery is to be attempted by fresh air, rhythmic traction upon the tongue, artificial respiration.

METALS, MINERALS, METALLIC SALTS.

Antimony.—This is found both as a metal and a mineral. The preparations of the metal best known to the public, and from the abuse of which poisoning is liable to occur, are tartar emetic, oxide of antimony, sulphureted antimony, wine of antimony and compound syrup of squills, known as Coxe's hive syrup.

Symptoms of Poisoning.—Marked depression characterizes poisoning by this substance. Violent purging and vomiting occur. The bowel discharges are characteristic and known as rice water stools; that is upon standing in a glass a separation can be noticed into two layers: an upper watery and clear, and a lower white and flocculent.

Treatment.—Evacuate the stomach by means of a stomach pump. Give tannic acid freely to form the insoluble and inactive tannate of antimony. The general precautions taken in all cases of depression are to be observed. Maintain the prone position, not raising the head to vomit, nor the body for defecation. Apply heat and use stimulating treatment, whiskey, strychnia and digitalis hypodermically. Give opium to allay pain; but counteracting its tendency to after depression by strychnia.

Arsenic.—This is a brittle crystalline metal of steel-gray color. Its freshly broken surface is very brilliant. It is found in its native state in the rocks of many different localities. It is also a constituent of cobalt, copper, nickel and tin ores.

Symptoms of Poisoning.—Rarely the course is one of rapid succession of severe pain, prostration and death. Frequently the period between ingestion and fatal ending is of five or six days' duration, including a time when there is an absence of marked symptoms and an apparent beginning of recovery. There is a burning sensation in the mouth and œsophagus. The stomach and bowels are strongly irritated. There is violent purging and vomiting with great pain over the entire abdominal region. The pain is of cramp-like character, and sometimes extends to the calves

of the legs or legs in general. The bowel evacuations are bloody "rice water" in character, and contain stringy mucus, supposed to be mucous membrane stripped from the bowels.

Treatment.—The acknowledged effective preparation to counteract arsenic when taken into the stomach is hydrated oxide of iron with magnesia, and is made as follows: Solution of tersulphate of iron, one thousand parts; magnesia, one hundred and fifty parts; water, a sufficient quantity. Mix the solution of tersulphate of iron with twice its weight of water, and keep the mixture in a well-stoppered bottle. Rub the magnesia and water to thin and smooth mixture; transfer this to a bottle capable of holding thirty-two fluid ounces, and fill it up with water. When the preparation is wanted for use mix the two liquids by adding the magnesia mixture gradually to the iron solution, and shake them together until a homogeneous mass results.

The Stomach Pump.—This antidote will not produce the desired result if the arsenic is not in solution, consequently the stomach pump takes a position of primary importance in the attempts at recovery. Following the evacuation of the stomach should be the application of external heat and the administration of stimulating drugs; morphia if necessary to quiet the pain. Water to flush the entire system.

Calcium.—This is a very abundant element in nature, occurring as limestone, marble, chalk, and so forth. Calcium chloride is perhaps the only drug derivative that might prove dangerous to the public. In excess this drug is a strong gastro-intestinal irritant, and poisonous effects should be treated by vegetable acids and demulcent drinks. Calcium chloride is not chloride of lime. For the latter see Lime.

Chlorine occurs in combination with sodium, potassium, magnesium and calcium. It is in its liberation that it proves itself dangerous to life on account of its poisonous vapor. (See Gases and Volatile Substances.)

Chromium.—The preparations of this mineral, most familiar to the public, are chromic acid, bichromate of potassium and chromate of lead. All the chromium preparations are irritants to the stomach and bowels and can cause death when taken internally. To counteract, use the stomach pump and give demulcent drinks. Administer stimulants under the skin and apply heat. Give lime-water or other weak alkalies if chromic acid has been taken.

Copper.—The salts of copper taken into the stomach in excess are powerful irritants to the stomach and bowels, giving the following symp-

toms: Copperish taste, intense pain in stomach, vomiting, purging, convulsions. Death may follow.

Treatment.—Give the chemical antidote, yellow prussiate of potassium, mild drinks, such as sweet oil, milk, white of eggs. Soaps and alkalies are said to be antidotal. The stomach should be emptied of the compounds formed either by emesis or stomach pump. Stimulating treatment and opium to relieve pain should be given.

Gold.—The pharmaceutical preparations of gold are decidedly poisonous, the chloride more so than corrosive sublimate, it is claimed. They are corrosive in their action, with symptoms similar to copper and other gastro-intestinal irritant poisons.

Treatment.—For treatment, evacuate stomach; stimulate. Sulphate of iron is said to be a chemical antidote.

Iodine.—This is a non-metallic substance, having a metallic lustre. It volatilizes at a low temperature and gives off a crimson-purple vapor. For poisoning by this drug, see Gases and Volatile Substances.

Iodoform.—This is a yellowish powder, with a strong and objectionable odor. It is used principally in the treatment of surgical wounds, and has caused local and systemic poisoning when so applied.

Symptoms of Poisoning.—Fatal results have been rare, but when occurring the symptoms were local rash, headache, vomiting, delirium, convulsions, coma. The kidneys may be affected and retention of urine or bloody urine occur.

Treatment.—Cause sweating by the hot pack and give diuretics to relieve the kidneys. Bicarbonate of sodium is said to be useful in promoting the elimination of the iodine constituent of the drug. Stimulate.

Iron.—The only salt of iron likely to do harm by its unguarded use by the public is the subsulphate or Monsel's salt, a solution of which known as Monsel's solution is used to stop hemorrhage.

Antidote.—The antidote is common soap. Monsel's solution should be applied and not taken inwardly.

Lead.—Perhaps no other metal has such diversity of uses in the arts and manufactures. It might be more accurate to say no other metal furnishes such an array in number and variety of instances of poisoning. As a rule industrial lead poisoning is a slow, chronic process, and does not call for the prompt attention required by the ingestion of excessive amounts of lead-burdened drugs.

Sugar of Lead.—Acetate of lead, known to the public as sugar of lead,

is the preparation of lead most frequently prescribed by medical practitioners.

Symptoms of Poisoning.—Indications of poisoning are pain in the region of the stomach and vomiting of a white, curdy material, resulting from the chemical combination of the hydrochloric acid of the gastric juice with the lead. Inflammation of the stomach occurs sometimes with constipation, sometimes diarrhœa, with black discharges, caused by the formation of sulphide of lead in the bowels.

Treatment.—Epsom and Glauber salts are preferred as chemical antidotes for their effective action chemically and for their purgative influence. Other antidotes are alkaline carbonates, soap and salt. Use stomach pump or emetics to insure evacuation of stomach contents. Apply heat and give stimulants. Use opium to relieve pain.

Lime.—Chloride of lime, used as a disinfectant and germicide, is slaked lime to which has been added 35 per cent. of chlorine. Its poisonous properties depend upon the chlorine gas it contains, for which see Chlorine, under Gases and Volatile Substances. If lime is taken into the stomach it causes great thirst, abdominal pain and constipation.

Antidotes.—To counteract give vegetable acids and demulcent drinks. Evacuate stomach; stimulate.

Mercury.—This is a silvery, white, heavy fluid metal, obtained chiefly from cinnabar, a sulphide of the metal. In the mining of the ore and in the many industrial uses made of the pure metal, its compounds and combinations, chronic poisoning occurs. Acute poisoning is more frequently due to the injudicious use of drugs containing some preparation of the metal.

Symptoms of Poisoning.—In severe cases these are metallic taste, burning sensation in the throat and stomach, vomiting, bloody stools, convulsions, coma.

Antidote.—The antidote is white of egg; additional treatment same as given in case of other corrosive poisons; evacuation; bland drinks; stimulants. Potassium iodide to aid in elimination. Opium to relieve pain.

Paris Green.—Symptoms of poisoning and treatment same as in arsenic.

Phosphorus is a non-metallic element, discovered in 1669 by Brandt, who obtained it from urine. In 1769 it was found in bones, the chief source of supply at present.

Symptoms of Poisoning.—In acute poisoning symptoms do not appear

for several hours. Pain in the œsophagus, stomach and bowels may be accompanied by purging or constipation. Discharged matters have characteristic odor and luminosity in the dark. The second or third day there may be a cessation of vomiting or of such symptoms for several hours, followed by a jaundice, pain, vomiting, delirium, convulsions, coma.

Antidotes.—Hare suggests peroxide of hydrogen and permanganate of potassium as antidotes. Sulphate of zinc is recommended for the same purpose. To the victim rescued from even acute poisoning is held out the gloomy prospect of an early death through fatty degeneration of vital organs.

Silver.—The salts of this metal that are most apt to cause poisoning are cyanide and nitrate. The cyanide is dangerous on account of its liberation of hydrocyanic acid when strongly heated. The nitrate is frequently used as a caustic, and when taken into the stomach produces marked gastric and intestinal inflammatory symptoms.

Symptoms of Poisoning.—The lips are first white from the caustic action of the drug, then become black. The vomited matter and the discharges from the bowels turn black upon exposure to the air. Convulsions, coma, paralysis, death may follow.

Treatment.—The chemical antidote is common salt. Soap and alkalies are supposed to annul the poisonous tendencies or to prevent the action of the poison upon the mucous membrane of the alimentary canal.

Tartar Emetic.—See Antimony.

Tin.—In the separation of tin from its ores poisoning is a rare occurrence, except from the deleterious substances combined with the tin. Pharmaceutically it is of little or no value, consequently it is not likely to fall into the hands of the public for perverted use. Of the chloride, three-quarters of a grain injected into the veins of a dog caused death. Fifteen grains introduced into the stomach caused vomiting and gastric irritation. Effective treatment would be evacuation, magnesia, mucilaginous drinks.

Zinc.—All the salts of zinc which can be absorbed in excess have a strongly depressing, even paralyzing, action upon the heart and all voluntary muscles, and may cause death by this means. Convulsions, coma and death is the brief statement of another bond of effects following zinc poisoning.

Treatment.—Empty the stomach. Give milk mixed with sugar and white of egg to form insoluble albuminate of zinc. Sodium or potassium carbonate, tannic or gallic acid have also been recommended as antidotes.

Overcome depression by stimulants, strychnia, digitalis, and so forth. Apply heat, give morphia for pain.

CORROSIVE POISONS.

Acetic Acid.—Acetic acid of the pharmacopeia is very mildly caustic. Taken internally it may prove very dangerous. Recovery has followed the injection of three ounces, followed by collapse and asphyxia from closure of the glottis. Suffocation was prevented by tracheotomy. Gastro-enteritis is liable to result.

Antidotes.—The chemical antidotes are lime-water and soap-water; milk and other bland drinks should be given. The stomach pump should be applied. Heat and stimulating treatment may be required.

Carbolic Acid.—This, in its pure state, is a white substance, appearing as needle-like crystals. It is very deliquescent and, with the addition of 10 per cent. of water or glycerine, becomes liquid; in this form it is usually dispensed.

Symptoms of Poisoning.—In large doses it has produced death in two or three minutes. In smaller doses it causes gastro-enteritis, marked by extreme pallor, cold sweats, stupor, coma, subnormal temperature, dark urine or suppression of renal secretion, very much contracted pupils. The drug has produced poisonous effects by absorption from surgical dressings.

Treatment.—Give soluble sulphates, Epsom or Glauber salts as the chemical antidote. A well-known authority says the lapse of several hours does not counter-indicate the use of the chemical antidotes as they follow the acid into the blood-vessels and tissues to unite with it. The stomach pump, heat, hypodermic stimulation, bland drinks should follow the use of the soluble sulphates. The use of oil as an emollient drink is prohibited owing to the belief that it aids the absorption of carbonic acid.

Hydrochloric Acid is not so destructive in its action as nitric or sulphuric acids. When swallowed the tissues are superficially destroyed, but rarely does deep erosion or perforation occur. It causes great thirst and restlessness, burning skin, agonizing stomach pain. Chemical antidotes are magnesia, soap or any dilute alkali. Supportive treatment may be required.

Nitric Acid.—In industrial occupations the inhalation of the fumes arising from this acid has repeatedly produced death. Its irritative action upon the larynx may cause spasm of the glottis severe enough to end

fatally by asphyxia. Taking it into the lungs has been followed by pulmonary edema and death. As a liquid in excess its action upon the alimentary canal is extremely corrosive, and where death does not follow promptly the following symptoms may appear:

Symptoms.—Burning of the mouth, œsophagus, stomach and intestines; intense pain, distention of stomach and intestines, frequent eructations, emesis, extremely fetid odor of exhalations and vomit, great thirst, cold extremities, anxiety, collapse. The stain upon the clothing and lips is yellow in color and is resembled by the stains of iodine and bromide. Discolorations made by the latter two drugs can be removed by caustic potash, but nitric acid stains are increased in brightness by the same application.

Treatment.—The treatment is the same as for other corrosive acid poisons, alkaline solutions, magnesia, soap, chalk, oils, demulcent drinks, heat and stimulation. Opium to allay pain. Recovery is rare and usually followed by early demise from destructive effects, such as constriction of œsophagus or bowels or loss of function in digestive organs.

Oxalic Acid.—Accidental poisoning has occurred by taking oxalic acid in mistake for epsom salts. The sour taste is very different from the taste of epsom salts.

Symptoms vary with the quantity taken. Taylor says the mimimum fatal dose is one drachm. Death has occurred as early as ten minutes after taking the poison in excess. With large amounts the early indications are those of a corrosive poison, pain in œsophagus and stomach, retching and bloody vomit. They may be followed by great depression and death without a struggle.

Treatment.—The antidotes are lime-water, magnesia, chalk; plaster from the wall has been suggested in emergency. These should be given promptly to form insoluble oxalates of magnesium or calcium. The oxalates of ammonium and potassium are soluble, poisonous and require the same antidotes as oxalic acid.

Sulphuric Acid.—This is the most corrosive and the most extensively used of mineral poisons, having the same poisonous symptoms as the other strong corrosive acids. The tissue discoloration due to its action is black. Death may be caused by laryngeal obstruction through violent inflammatory effects; by collapse due to perforation of the stomach or by shock due to extensive destruction of tissues. If recovery occurs the injured tissue sloughs off and subsequent contracture or loss of function may cause death later on.

Treatment consists in the prompt use of magnesia, soap, chalk, lime-water as antidotes. After neutralization of the acid give mucilaginous drinks, milk or other bland drinks. The deep and extensive tissue destructions render the use of emetics and stomach pump dangerous. The strong muscular effort accompanying emesis and the manipulation of the pump both tend to result in perforation. Counteraction of depression by heat and hypodermic administrations is, of course, strongly indicated.

Tartaric Acid, more irritant, but less expensive than citric acid, is sometimes used instead of the latter in making a substitute for lemonade. In large quantities it is a gastro-intestinal poison and has caused fatal results.

Antidotes.—Give soap-water, lime-water, magnesia, chalk as antidotes. Use the stomach pump or emetics; administer stimulants; apply heat.

Ammonia.—This is a transparent, colorless gas, having an acrid taste and an exceedingly pungent smell. It is alkaline in reaction. The best publicly-known preparation containing this gas is aqua ammoniæ or water of ammonia, a solution of 10 per cent. by weight of the gas in water. Death has been caused by inhalation of the gas, by ingestion of the liquid and by the muriate and carbonate. Fatal results have followed after the lapse of four minutes through spasm of the glottis. The same ending may occur after comparatively long periods as with other corrosive poisons, causing stricture or prolonged prostration.

Symptoms.—These are pain, burning sensation from mouth to stomach, vomiting of bloody mucus. Cardiac and respiratory efforts are greatly stimulated, but soon equally depressed. Lachrymation, sneezing and cough are marked. Ammonia differs from the other alkalies in affecting the nervous system, while the other are destructive in local effects only.

Treatment.—As an antidote, lemon juice and dilute vinegar or acetic acid may be given. Bland drinks and vigorous efforts to counteract prostration should follow. Opium may be required to allay pain and reduce nervous symptoms.

Soda.—This is the hydrate of sodium, known commonly as caustic soda. When fluid it is moulded and placed upon the market in the shape of small sticks or cylinders not quite as large as an ordinary lead pencil.

Symptoms of Poisoning.—It is corrosive in its action, causing, when taken, pain throughout the alimentary tract and destroying, by softening, all tissues with which it comes in contact. Vomiting occurs. The soft-

ened and destroyed tissues slough, sometimes in mass, and inflammatory conditions follow.

Treatment.—Give weak acids, oils, demulcents, and use stimulating treatment.

Potash.—This is the hydrate of potassium, commonly called caustic potash. It is more corrosive than caustic soda. Poisonous symptoms and treatment are the same. (See Soda.)

VEGETABLE POISONS (in form of drugs).

Limited space and the great number of substances included under this heading compel the briefest notice of symptoms and treatment where poisoning has occurred by accident or overdoses.

Acetanilid, a white powder; common constituent of advertised headache powders. Causes cyanosis, prostration, heart failure. Use strong stimulants, external heat.

Acid, Boric, in large amount produces nausea, vomiting, collapse, cardiac failure. Treatment is to evacuate stomach, stimulate.

Acid, Salicylic, in large amount causes deafness, delirium, defective breathing, respiratory failure. Treatment is by strychnia and other stimulants.

Aconite, a dangerous drug; small amount may prove fatal.

Symptoms of Poisoning.—Tingling of mouth and throat becoming general, pallor, anxiety, slow pulse, weak respiration, great muscular weakness, heart failure.

Treatment.—Keep victim on flat of back, with head below body. External heat, hypodermic injections of ether, alcohol, digitalis, strychnia in large doses, atropine, artificial respiration if required.

Alcohol.—Frequent cases of acute alcoholic poisoning occur among children.

Symptoms.—Giddiness, drunken gait and manner, flushed face, may be pale, stupor, coma, sometimes death long after apparent recovery.

Treatment.—Digitalis, strychnia hypodermically, external heat, artificial respiration, prone position, with head lower than body.

Antipyrine.—This causes erythema or other skin disturbances, tingling sensations, depression. Treatment is same as aconite poisoning.

Apomorphine causes prompt and severe vomiting, depression, cardiac failure. Use hypodermic stimulation, external heat as antidotes.

Absinthe causes insensibility, convulsions, involuntary evacuations, possibly death. Evacuate stomach, give demulcent drinks, stimulate.

Aspidium or Male Fern.—Used to destroy tape worm. Overdose might cause gastro-enteritis, collapse, death. Evacuate, stimulate.

Atropine, Belladonna, Hematropine cause flushed face, general redness of skin, great dryness of mouth and throat, dilated pupils, prostration. For treatment insist upon prone position, evacuate stomach if seen early, stimulate, use artificial respiration if necessary.

Bloodroot.—See Sanguinaria.

Camphor.—In large doses produces roaring in the ears, delirium, convulsions, possibly gastro-intestinal symptoms. To treat, evacuate, stimulate.

Cantharides.—Produces vomiting, bloody stools, priapism, strangury, convulsions, coma, respiratory paralysis. For treatment, evacuate, give morphia for pain, bland drinks, stimulate.

Colchicum.—Symptoms of gastro-enteritis, great pain, fatal depression. For treatment, evacuate, give tannic acid, stimulate, morphia for pain.

Conium.—Muscular depression, paralysis of respiratory muscles. Evacuate, give tannic acid, atropine, stimulate.

Digitalis.—Produces headache, slow full pulse becoming irregular; great prominence of the eye-ball, pearly color of sclerotic coat, vomiting. Death is caused probably by cardiac spasm.

Treatment.—Give tannic acid as a chemical and aconite as a physiological antidote. Evacuate, enforce prone position, stimulate. Prone position should be maintained for days after apparent recovery, as death has immediately followed erect posture after digitalis poisoning of a day or two previous.

Elaterin and Elaterium in excess cause gastro-enteritis. Use stomach pump, heat, stimulant, opium.

Ergot.—Enormous doses are required to cause fatal results. Symptoms are tingling sensations, vomiting, muscular spasm, great coldness of the surface. Evacuate, give purgatives, stimulate, enforce prone position.

Fusel Oil causes muscular rigidity, respiratory failure. Evacuate, stimulate, use artificial respiration.

Gamboge causes gastro-enteritis. Evacuate with pump, stimulate, apply heat, give demulcent drinks.

Gelsemium causes great depression, falling or dropping of the eyelids,

double vision, respiratory failure. Evacuate, stimulate hypodermically with atropine, strychnine, ether, digitalis, apply heat, use artificial respiration.

Hemlock.—See Conium.

Henbane.—See Hyosciamus.

Hyosciamus causes giddiness, incoherence of speech, loss of power to swallow, partial loss of voice, difficulty in respiration, delirium. For treatment, evacuate, stimulate.

Jaborandi.—Profuse sweating, salivation, vomiting, diarrhœa, ocular irregularities. Give atropine as antidote, evacuate, stimulate.

Laudanum.—See Opium.

Lobelia causes vomiting, sometimes purging, great depression, respiratory failure. Give tannic acid, stimulate, apply heat, use artificial respiration.

Morphine.—See Opium.

Nicotine.—See Tobacco.

Nitro-Glycerine causes severe headache, rapid, irregular cardiac action, collapse. Give atropine, digitalis, strychnine. Maintain recumbent position.

Nux Vomica.—See Strychnia.

Opium causes mild excitement or contentment, followed quickly by sleepiness, stupor. Cyanotic face, contracted pupils, gradually decreased frequency of breathing, respiratory failure. For treatment evacuate stomach with pump; give strong coffee by mouth or rectum; use flagellation or the battery to keep patient awake; keeping victim in motion by walking is also useful for the purpose, but may exhaust him. Give hypodermic injection of strychnine; apply heat; use artificial respiration.

Pinkroot.—See Spigelia.

Bloodroot, Sanguinaria, causes salivation, vomiting, purging, convulsions, respiratory failure. For treatment evacuate, stimulate.

Spanish Fly.—See Cantharides.

Spigelia causes dilatation of the pupils, prominence or protrusion of the eyeballs, internal strabismus, retching, increasing muscular weakness, depressed respiration, coma, death.

Treatment.—Evacuate; stimulate; use heat and artificial respiration.

Squills produce gastro-enteritis, bloody urine, strangury, convulsions, death.

Treatment.—Evacuate; stimulate; give demulcent drinks.

Strychnine.—Symptoms may begin gradually or be pronounced from

beginning. If they come on slowly, there is stiffness of jaw and neck; slight, then strong muscular contractions, with body bent backward and resting on head and feet. Intervals of relaxation succeeded by tonic convulsions; death from exhaustion, or more frequently by asphyxia due to spasm of muscles of respiration.

Treatment.—Give tannic acid. Evacuate stomach, administer bromides and chloral. Amyl nitrite may lessen the spasm. If drugs cannot be given by mouth on account of convulsions, prevent same by chloroform, and at same time give bromides and chloral per rectum. If periods of relaxation are too brief to permit of chloroform securing control give amyl nitrite hypodermically.

Sulphonal causes sleepiness, stupor, scanty or suppressed urine, unconsciousness, death by respiratory failure. For treatment evacuate, stimulate. Give diuretics; use artificial respiration.

Tansy produces abortive tendencies, convulsion, coma, respiratory failure. For treatment evacuate, stimulate, use artificial respiration.

Tobacco contains an alkaloid, nicotine, that is said to cause death as promptly as hydrocyanic acid. Thirty grains of tobacco or one to two drops of nicotine are sufficient to cause death in less than half hour by the first and in a few minutes by the second.

Symptoms.—Nausea, vomiting, cold, clammy skin, general muscular relaxation, pupils contracted, then dilated, odor of person disagreeable.

Treatment.—Recumbent position; tannic acid; evacuation of stomach; stimulants; heat.

Fungi, toadstools, and so forth, may cause vomiting, purging, convulsions, delirium, stupor, death. Evacuate, give Glauber or Epsom salts, stimulate.

Poison Ivy, Poison Oak, Poison Vine cause irritation of skin, particularly of face, itching, swelling, vesicular eruption. If taken inwardly drowsiness, stupor, delirium, convulsive movements.

Treatment.—Externally use alkaline solutions or dilute subacetate of lead. Rest, low diet, laxatives, opium.

Poke Berry and Root causes nausea, vomiting, purging, cardiac and respiratory depression, convulsions. For treatment evacuate, stimulate.

Sumach.—See Poison Ivy, and so forth.

Toxicodendron.—See Poison Ivy, and so forth.

FOOD OR PTOMAINE POISONS.

A person can be poisoned from eating foods as: meat, fish, milk, etc. The poisons which cause food poisoning (usually called ptomaine poisoning) depend upon their presence in the food when eaten because of the development in the food or its mixture with poisons.

Poisonous Meat.—Poisonous meat results from the presence of bacteria and their poisonous secretions. The infection from eating meat arises in two ways: 1. The meat derived from an animal which may be perfectly healthy and when slaughtered yield flesh entirely wholesome and free from bacteria, acquires poisonous properties only by the introduction of bacteria from without by being placed or handled in unclean utensils, vessels, etc., and thus becomes contaminated. Meat kept in a warm temperature favors the development of the bacteria which came from without, the germs thus produced multiply and give rise to poisonous products and these render meat dangerous which was previously healthy, and this is particularly true in respect of canned meats. The chopping of meat favors the spreading of bacteria throughout the mass. Secondly, the infection of meat results from the use of meat derived from animals which were diseased at the time of slaughter. Meat from such a source contains germs which will cause symptoms of poison or allow poisonous bacteria to develop rapidly on being kept for a short time. Poisoning will follow the eating of this meat and may readily lead to an acute infection, rendering the users very ill or cause death. Many cases of inflammation of the stomach and bowels (gastro-enteritis) are due to the eating of diseased meat.

Change in the odor or taste of meat is not always indicative of the presence of poisonous products.

Owing to so many poisonous products developing in meat, it is impossible to draw a sharp difference between the symptoms arising from the different ones. However, two important forms of symptoms are contrasted. In one, the nervous symptoms predominate and are well marked, and in the other the symptoms are in the stomach and intestines. The first groups of symptoms are spoken of as Botulismus.

Poisoning from Sausage Bacillus (*Botulismus*).—Under this title are included all forms of poisoning caused by eating sausage. The poisonous products in the sausage are a result of the presence of the Bacillus Botulismus, named by Van Ermengem, who discovered the germ in 1905 in poisonous ham.

Symptoms.—The attack begins in from twenty to thirty-six hours after eating the diseased meat. The patient feels like vomiting (nausea), pains in the stomach and vomiting then follow. Diarrhœa or constipation, usually the former, are complained of. In thirty-six to forty-eight hours interference with vision develops, the patient does not see clearly and does not recognize persons about him. Double vision is present, the upper eyelids droop and a peculiar strong stare can be seen. A burning thirst and a sensation of strangling are complained of. The mucous membranes of the mouth, nose and throat are reddened and covered with a thick, glistening mucus, which causes violent attacks of coughing and suffocation. The swallowing of food or even water is difficult and causes attacks of choking. Extreme weakness of the muscles which lasts for weeks after the attack are annoying symptoms.

Diseased Meats.—Under this title are included the poisons in meat which cause sickness due to the animals being diseased at the time of slaughter. These constitute the most common form of meat poisoning, and cause severe gastro-intestinal (stomach and bowel) symptoms. The bacteria symptoms are too numerous to mention here, but they are said to be due to any one of a group of germs in the meat which show close affinity on the one hand for the colon bacillus and on the other for the hog-cholera bacillus. Each group of these germs cause poisonous symptoms which represent a number of diseases, resembling each other as regards their symptoms and are difficult to tell apart.

The Symptoms Arising from Eating Diseased Meat.—The attacks may begin immediately following a meal, but usually occur in from six to eight hours after eating. Patient desires to vomit (nausea) then vomiting occurs, followed by sharp, colicky pains in the abdomen, profuse diarrhœa and great exhaustion. A rash and itching of the skin is present. Death often follows these symptoms, but not as often as in poisoning from eating diseased sausage which contains the bacillus botulismus.

The above symptoms are usually due to eating beef, veal, pork and horse flesh derived from animals which suffered at the time of slaughter from blood poisoning or intestinal infection. Boiling of such meat does not necessarily prevent the human being from suffering from the same disease which the animal had when slaughtered.

Treatment.—Any person taken suddenly with any of the above symptoms following the eating of meat, should summon the family doctor. Early action may save life. The sufferer can be given hot mustard water to cause vomiting. The bowel should be washed out with a rectal syringe,

using warm salt water (two teaspoonfuls to the quart) every hour until the doctor arrives. Calomel in one-fourth grain doses every half hour until two grains are taken. Active purging is necessary. Diarrhœa is a favorable symptom, as nature is trying to eliminate the poison by the bowel, it should not be checked too soon.

Poisonous Fish.—Many fish are always poisonous, while certain fish are only poisonous to man during the spawning period and other fish contain poisons in the testicles and ovaries which when eaten cause severe and even fatal poisoning. The latter are classified as Physiologic Poisons, and are simply normal poisons within the body of the fish and are not due to bacteria. Another group of fish poisons which occur and are dangerous to man when eaten, are the Bacterial Poisons. These are poisons which occur in fish and cause disease when eaten. They are due to bacteria and may be in fish which were diseased at the time of killing and when eaten raw will cause the person to become ill. On the other hand, fish may be perfectly wholesome before death and the following careless handling and lack of preservation cause bacterial contamination with the production of poisonous products.

The poisons occurring in fish are caused by many varieties of bacilli, too numerous to mention in these pages.

Boiling will not destroy all bacteria in fish, but the danger of infection is reduced only by eating fish which is thoroughly boiled or baked.

Symptoms of Fish Poisoning.—General weakness occurs in from ten to twenty-eight hours after eating a meal with fish, the greater the severity of the attack if the meal has consisted of fish only. A small amount of diseased fish eaten will often prove fatal if the stomach is empty. A larger amount may not be so fatal if the person has eaten other foods at the same time which have prevented the poisonous fish from being rapidly absorbed. Other symptoms are a dull pain in the abdomen, difficult breathing, impaired sight, double vision and dizziness, complete dryness of the mouth and tongue, inability to swallow and loss of speech. The temperature does not rise.

Another group of symptoms may occur from poisonous fish differing from the former. These consist of violent vomiting, excessive diarrhœa, dizziness, the hands and feet tremble, prostration and heart weakness, and a rash and itching of the skin are present in some cases.

Canned fish has caused disease, but these cases usually occur from the fish having decomposed from either being diseased before packing or

improperly preserved, and these conditions have favored the development of bacteria and their poisonous products within the can.

Animal Parasites.—Worms can develop in the human being from eating fish which contain the larvæ of these worms. The Bothriocephalulatus is the one most often developed from eating fish. Fish also cause disease by eating decomposed meat, etc., and then being eaten by man, the poison in the fish poisoning his system. All fish should be thoroughly cooked before eating.

Poisonous Shellfish.—These will cause disease because they are found in polluted waters and certain bacteria which cause symptoms of fish poisoning in man when eaten.

Poisoning from Mussels.—The common mussel (Mytilus edulis) causes poisonous symptoms in man when used as a food, particularly in England and on the continent of Europe.

Symptoms of Mussel Poisoning.—There are three types of symptoms. First type: Severe pains in the stomach, nausea, vomiting, diarrhœa come on some hours after eating; death is rare as a rule. Second type: The patient complains of nervous sensations, as of heat, itching of the eyelids, this spreads over the rest of the face and may involve a large part of the body. A diffused rash with hives develops. Sore throat and difficult breathing are sometimes pronounced. Death rarely ever occurs. Third type: The symptoms of this type resemble the infection due to the bacillus botulismus found in diseased sausage. They arise from eating mussels which have lived in polluted water. Boiling does not destroy the germs. The onset of symptoms is sudden, almost immediately after eating a meal. Giddiness with inability to stand or sit, mental excitement or delirium, numbness of the hands and feet, diminished sensation, the pupils dilated, abdomen distended, throat dry, the neck constricted and difficulty in breathing and swallowing are commonly observed. Death occurs more often in this type!

Oyster Poisoning.—Oysters cause many cases of illness when used as a food. This is due to the fact that they come from oyster beds which are located in polluted water. They carry typhoid germs which cause typhoid fever. Also gastro-intestinal symptoms due to their contained bacilli and poisonous products derived from the polluted water. Wholesome oysters can be contaminated by dirty handling or improper preservatives before distribution.

Symptoms of Oyster Poisoning.—A few hours after a person has eaten a raw oyster, he complains of headache, pains in the side, difficulty in

swallowing, impaired vision, the gait becomes staggering, swallowing impossible, speech difficult and mumbling. Rash appears with itching in different parts of the body. They usually recover, but death has occurred following the eating of raw oysters on an empty stomach.

Lobster and Crab Poisoning.—The eating of these as articles of food have been followed by severe pains in the stomach, diarrhœa, rash and itching of the skin and in some cases symptoms similar to those occurring in persons who have eaten oysters, fish and diseased meat.

Lobsters and crabs are dangerous unless wholesome and alive when cooked; even then they may be dangerous, as they are filled with bacteria and their products derived from decomposed fish, slop, etc., which they live upon in polluted waters.

Poisonous Milk and Its Products.—Milk is the cause of many cases of acute poisoning due to its extensive use in the raw state and ready exposure to contamination from bacteria. It also carries typhoid fever, diphtheria, scarlet fever. It is responsible for the gastro-intestinal complaints occurring during the summer months, especially among infants. Milk can contain the same bacteria and their poisonous products as are found in diseased meat, and thus similar diseases result with the same set of symptoms. The products of milk as cheese, ice cream, cream puffs, etc., cause diseases due to a poisonous product called tyrotoxicon. This arises no doubt as a result of bacterial action and causes severe illness, as well as death in some cases. The symptoms derived from decomposed milk products are the same in a general was as those caused by bacteria in diseased meat, fish, etc.

Treatment of any of the above diseases consists in summoning a physician immediately; cause vomiting by giving mustard water. Calomel, one-quarter grain every half hour until two grains are taken. Wash bowels out with a warm salt solution (two teaspoonfuls to a quart of water) and repeat every hour until all signs of poison are removed. Apply hot water bottles or bags to warm the patient.

Any person (or those in attendance) should be careful whenever possible to place the can or sample of food from which the person has eaten where it can be kept intact until examined by the physician for the purpose of finding the nature of the poison which caused the patient to be ill.

Poisonous Vegetables.—The eating of vegetables containing bacteria and their poisonous products causes the same group of diseases as occurred from eating diseased meats, fish, etc., showing that the bacteria infected meat, fish, etc., if contaminated vegetables will have the same result.

Many of the diseases derived from eating canned vegetables are due to the presence of metallic poisons, usually due to carelessness or ignorance in canning in permitting too much dangerous metal to enter the can.

People who eat too much rye and other grains, particularly in European countries, often suffer from Ergot poisoning, caused by the grain containing parasitic fungus called Claviceps purpurea, which develops in the flowers of rye and other grains. The symptoms of this poisoning may be nervousness and convulsions or else gangrenous sores break out upon the body.

Vetch poisoning is another rare condition occurring in Austria and Italy, in Northern Africa and India. It is due to the use of Vetch seed in the form of a flour as a partial substitute for wheat. Persons after eating bread made of this Vetch seed flour, complain of sudden and severe pains in the back, inability to walk, due to paralysis of the limbs, also tremors and fever. The nature of the poison is not definitely known, but it is considered as belonging to the tonal groups of proteins.

Mushroom Poisoning.—This is due to persons eating the poisonous varieties in mistake or ignorance instead of the edible variety, which is harmless. The dangerous species contain a highly poisonous substance called muscarin.

Symptoms of Mushroom Poisoning.—Severe depressing of the heart and circulation. Severe watery diarrhœa. Pain in the stomach. Death may occur in three to four hours after eating.

Treatment of Mushroom Poisoning.—Send for the nearest physician, wash out the stomach with a stomach pump, or cause vomiting by taking hot mustard water. Apply external heat and administer a cup of hot coffee, or brandy or whiskey in teaspoonful doses every half hour until physician arrives.

BOOK VI

Is a simple method of diagnosing disease by symptoms.

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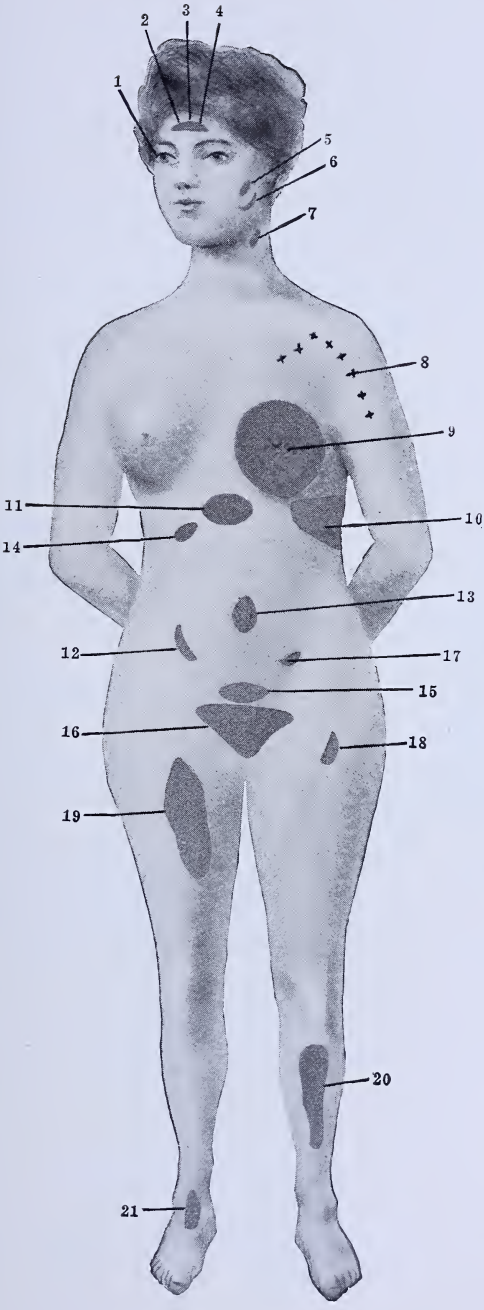

CHART 1

1. Inflamed Eyes or Neuralgia.
2. 3, 4. May be due to Constipation, Dyspepsia, or Nasal disease (Frontal Headaches).
5. Diseased Teeth, Neuralgia.
6. Diseased Teeth, Neuralgia, Mumps.
7. Tonsilitis, Inflamed Glands.
8. Angina Pectoris.
9. Pregnancy, Ovarian disease, Hysteria, Neuralgia, Abscess, Cyst or Cancer of the Breast.
10. Impacted Splenic Colon, Colitis, Stomach Ulcer or Cancer, Enlarged Spleen, Acute Rheumatism.
11. Stomach.
12. Kidney and Gall Bladder.
13. Stomach, Ulcer, Cancer of Omentum.
14. Vermiform Appendix (Appendicitis).
15. Uterus or Womb.
16. Cystitis, Neuralgia, Ulcer, Uterine or Ovarian disease, Inflammation, Menstrual Pains.
17. Ovary, Inflammation or Neuralgia.
18. Ovarian disease.
19. Ovarian or Uterine disease, Displaced Uterus, Psoas Abscess.
20. Rheumatism, Periostitis, Bone Tuberculosis, Locomotor Ataxia.
21. Rheumatism, sprain at Ankle.

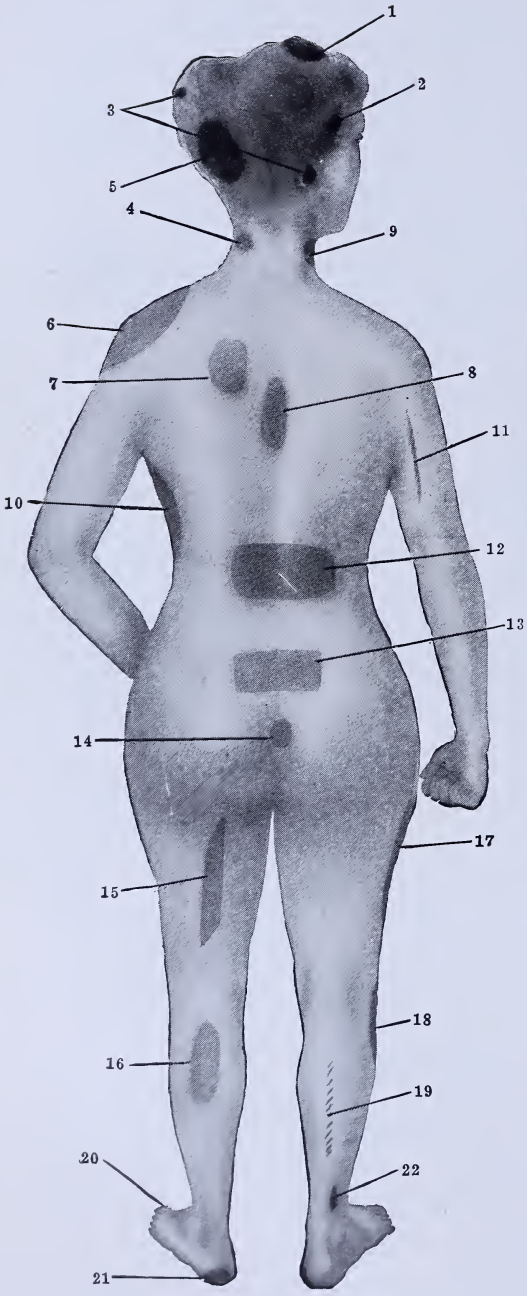

CHART 2

1. Anæmia, Hysteria, Neurasthenia, Uterine and Ovarian.
2. May originate in the eye or teeth.
3. Earache, Neuralgia, disease of the Tongue or Bone.
4. Rheumatism, Cerebro-Spinal Meningitis.
5. Neurasthenia, Irritation of the Spine, Epilepsy, disease of the Vertebræ, Uterine, Brain Tumor.
6. Muscular Rheumatism.
7. Flatulence (gas), Rheumatism, Gastritis, Gastric Ulcer.
8. Diseases of the Stomach.
9. Laryngitis, Sore Throat.
10. Pleurisy, Pleuro-Pneumonia, Neuralgia.
11. Rheumatism.
12. Lumbago, Fatigue, Flatulence, Hernia, Cystitis, Uterine or Ovarian disease, Acute Inflammation of the Kidneys, Spinal Irritation.
13. Ovarian and Uterine disease, Inflammation of the Pelvis, Rectal Ulcer, Cancer, Hemorrhoids, Hip Joint disease.
14. Hemorrhoids, Coccygodynia, Fistula, Abscess, Uterine disease.
15. Sciatica, Rheumatism.
16. Cramps, Fatigue, Fallen Arch.
17. Rheumatism, Fatigue.
18. Inflammation of Joint, Varicose Veins.
19. Sciatica, Varicose Veins.
20. Gout, Ingrown Nail.
21 Gout, Rheumatism.
22 Sprained Ligaments.

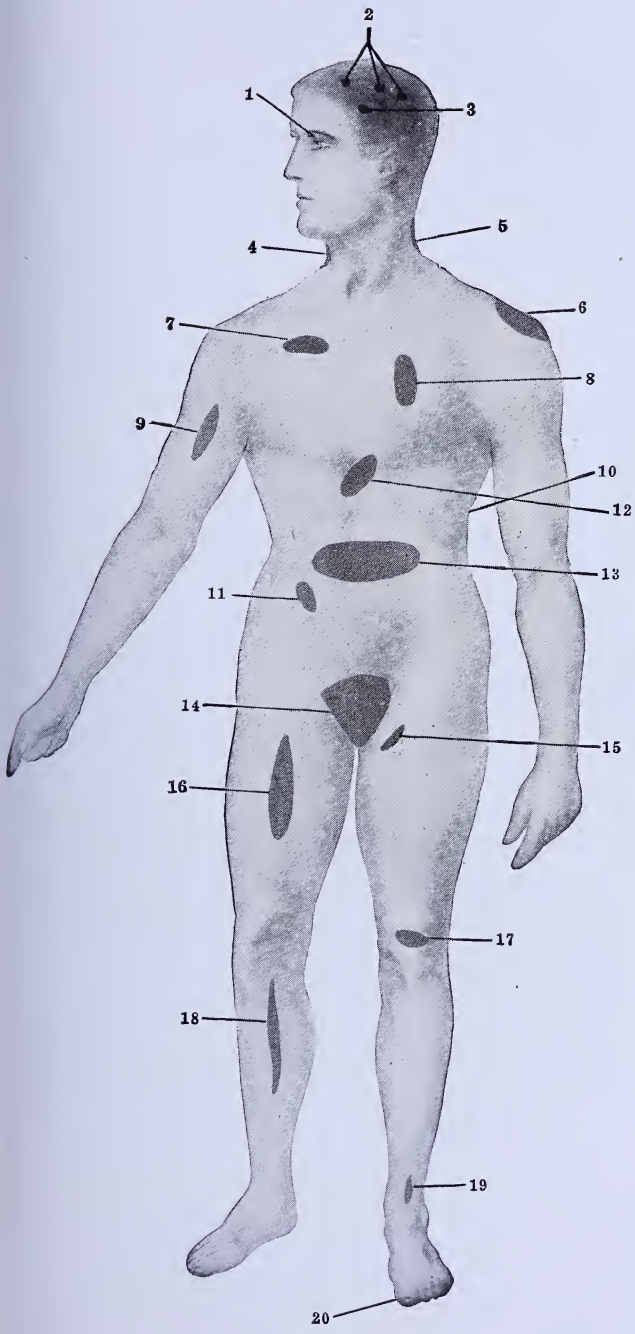

CHART 3

1. Diseases of the Eye or Lids, inflammation or Neuralgia.
2. Headaches due to Constipation, Indigestion and Neuralgia.
3 Temporal Neuralgia.
4. Goitre, Laryngitis and various Throat diseases.
5. Diseases of the Spine and Brain, Rheumatism.
6. Muscular Rheumatism.
7. Pneumonia, Tuberculosis, etc.
8. Heart and Pericardium.
9. Rheumatism, Neuralgia, Fatigue.
10. Pleurisy, Pleuro-Pneumonia.
11. Appendicitis and Inflammation of the Bowels.
12. Stomach Indigestion, Flatulence, Cancer and Ulcer.
13. Inflammation of the Bowels, Colitis.
14. Inflammation of the Bladder.
15. Abscess in Groin.
16. Rheumatism, Fatigue.
17. Inflammation of the Joint.
18. Varicose Veins, Rheumatism.
19. Inflamed Joint or Torn Ligaments.
20. Gout.

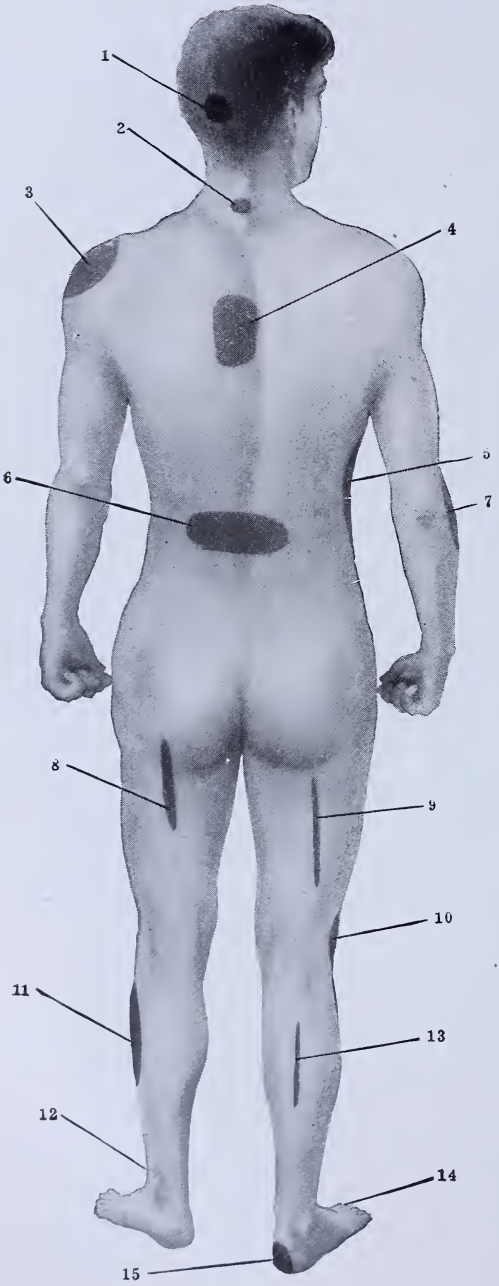

CHART 4

1. Headache or Neuralgia of the Scalp.
2. Stiff Neck or injury to Spine.
3. Rheumatism.
4. Reflected from the Stomach.
5. Pleurisy may be either side.
6. Lumbago or Kidney Disease.
7. Neuritis along either side of arm.
8. Sciatica running down back of leg.
9. Sciatica.
10. Rheumatism or Inflamed Joint.
11. Enlarged Veins or Rheumatism.
12. Inflamed joint or Sprained Ankle.
13. Sciatica.
14. Gout.
15. Rheumatism.

Book VI

DIAGNOSIS

OR THE ART OF TELLING A COMPLAINT BY ITS SYMPTOMS

Diagnosis is one of the most difficult things in medical practice, yet in order to give proper treatment it is first necessary to be sure of the complaint. Generally this must be discovered by diagnosis, that is by taking into consideration various symptoms and their meaning.

In making diagnosis consideration must be given to age, sex and temperament. Symptoms which might indicate serious illness in a child might mean nothing with an adult; a man of highly nervous temperament might show peculiarities that in no way would disturb his normal state, yet in respect of one of phlegmatic temperament these same symptoms might be indicative of very serious trouble; conditions which might mean much in the case of a woman might mean nothing in the case of a man. A man who has high brain qualities without proportionate body development will show symptoms which a man whose body development is equal to that of his brain would not show. When the brain power is predominant the person is said to be of cephalic temperament, that is thinking temperament. When the lungs and heart are largely developed and this development preponderates, as shown by large chest, force of circulation, redness of skin and general animal activity, the person is said to be of thoracic temperament. When the abdomen, which contains the organs of receiving, digesting and disposing of the materials which nourish the body, is predominant the person is said to be of abdominal temperament. When the bones are large and the muscles naturally exceptionally strong and there is a largeness of frame and solidity of structure and exceptional powers of muscular endurance the person is said be of muscular temperament.

To diagnose a case properly, one must consider:

(1) The age and sex of the patient.

(2) The appearance of the patient at the time.

(3) Whether or not there is suffering and if so, where the pain is located.

(4) How long illness has existed; and what different abnormal conditions have shown themselves.

The temperature, the pulse, the condition of the mouth, the tongue, respiration, urine, fecal discharges, etc., must be carefully examined and inquiry made as to digestion and generally as to the condition of the patient preceding the time of diagnosis.

One of the great factors in diagnosis is the location of pain. Pain is of diagnostic significance and should be carefully studied in respect of every case. It indicates a primary cause but it must not be overlooked that the location may be far removed from that part of the body in which the cause exists. Pain may be reflex; that is, it may result from a stimulation or irritation of either the cerebro-spinal or the sympathetic system of nerves, or both. The cerebro-spinal and sympathetic nerves are in close association and there are special nerves for the conduction of pain and special organs which are affected thereby and which convey to the consciousness the sensation of pain which thereupon attempts to designate the locality or region in which the pain is being produced. Sensibility to pain differs in degree according to the location of its cause. A nerve may be stimulated in any part of the nervous system and if such stimulation be sufficient pain will be localized either at or in the neighborhood of the end of the nerve. It happens, however, that these nerves are closely associated in the brain with nerve fibres which supply structures at distant points that they sometimes become irritated and pain will in consequence be felt in spots quite remote from the actual seat of trouble (reflex pain).

It is claimed by some authorities that in disease of any internal organ pain is never felt in the organ itself, but is communicated through the sympathetic to the cerebro-spinal nerves and then to the surface of the body in one or many points, sometimes diffusing over a much greater area than that occupied by the organ affected. If the organ be highly inflamed or otherwise seriously diseased the nerve may communicate to certain surface centres a feeling or sensation of actual pain, but where there is less stimulus the sensation of pain may only be felt upon the part of the surface of the body in question being touched. In locating pain produced by pressure it is necessary to be exact in order to be sure of the particular nerve which is

Coated or Bilious Tongue.

Normal Tongue.

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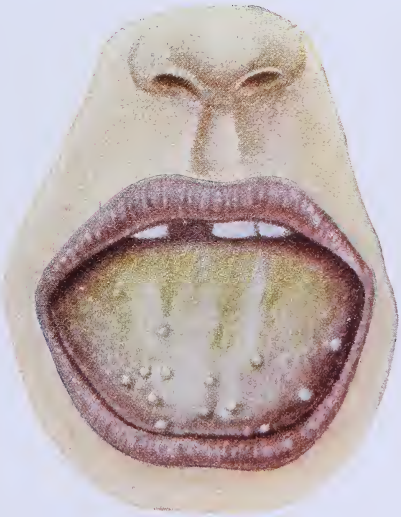
Syphilitic Lobulation of the Tongue.
"Cobblestone Tongue."



Herpetic Inflammation of the Tongue.

sending the sensation so that this nerve may be traced back and its association with other nerves in the cerebro-spinal and sympathetic systems properly considered.

Without years of study of the human body it is impossible for any layman to correctly locate the exact seat of a trouble without full and exact description and tables showing clearly the action of the nerves upon different parts of the body in respect of the various diseases to which the organs of the body are subject. The object of this present chapter is to give such tables and so clearly set forth the effect of different diseases upon different parts of the body that the layman may, in a vast majority of cases, as efficiently diagnose most diseases as the ordinary physician.

In diagnosing care should be taken to exactly locate any pain. Consideration should be given as to how long the pain has been felt. Is the pain continuous or intermittent, and if the latter does it appear at any particular part of the day or night, or after eating, going to stool, urinating, etc.? Is it worse at certain times of the year or in certain kinds of weather? Is it relieved or increased by any special posture or action? The question of intensity of pain is important, yet is oftentimes hard to arrive at. People suffering from nervous troubles are apt to exaggerate the severity of the pain they feel. Temperament modifies the expression of pain complained of. Some patients complain bitterly of slight pain, others pride themselves upon being stoical. The pulse and temperature when the pain is at its height should be compared with the pulse and temperature during intervals of relief. Consideration should be given to the quality of the pain, whether it is spasmodic, darting, gnawing, burning, tingling, griping, and so forth. It must be remembered, too, that the same disease may manifest itself in different ways in different people, and so it happens that what is the most prominent symptom with one patient may be a minor symptom with another. Thus in pleurisy, the most distressing feature with one patient may seem to be the coughing spell, while with another the coughing spell may not be particularly noticeable, but respiration be so painful that the difficulty in breathing becomes the outstanding feature.

It is to be borne in mind by everyone in studying a table or description of symptoms that there is always a possibility of the reader coming to the conclusion that he has this or that symptom of some disease, when as a matter of fact, such symptoms are in reality lacking. In their early study of disease at college, medical students frequently become obsessed with the idea that they have this or that disease from reading and studying

such disease and then imagining that they have the symptoms described. Quack doctors and patent medicine men so thoroughly appreciate this that they build up their advertising literature to impress people who may read that they are sufferers from the complaint which the quack or the patent medicine is supposed to cure. This fact must always be kept in mind, not only in studying the table of symptoms which is here given, but in reading the general description of disease in the special articles in respect thereof to be found in different parts of this work.

TABLE OF SYMPTOMS.

The following table if carefully studied in conjunction with the special articles throughout this work on the diseases indicated will prove a ready and practical method of telling what complaints may be by their symptoms. To illustrate: Someone in your family may have a chill. It may be of such character that no one need be concerned, or it may be the onset of some serious illness. It is important to know at once. You turn to the following table and run your finger down the first column (Most Noticeable Symptoms), which is arranged alphabetically, until you come to the word *Chills;* you then consult the second and third columns ("Additional Symptoms" and "Disease Indicated") in line with the word *Chills* and you see that chills, when accompanied with piercing pain on one side of the chest, dry cough, short breathing and difficulty of lying on affected side are set down as the symptoms of Pleurisy, while chills followed by violent pain in the abdomen, increased by the slightest pressure, nausea, dry tongue and full hard pulse, are symptoms of Peritonitis. Suppose the symptoms point to Peritonitis; you at once turn to the index in the back of the book and find at what page or pages information may be found in respect of this disease and you are at once in possession of the best knowledge extant in respect of the subject.

It is to be observed also that each set of symptoms as hereafter following is numbered and that at the end of this chapter there is an index showing the symptom number or numbers of the different diseases for which symptoms are given in this chapter. This index relates only to the actual contents of this chapter, its object being to enable the reader to quickly turn to different outstanding symptoms in the same disease, and it must not be confused with the general index at the back of the book which refers to articles throughout the whole book. Thus symptom No. 2 indicates inflammation of the bladder and by turning to the index at

end of this chapter we find that symptom No. 150 and 220 also refer to the same disease but give different outstanding features; but when it is desired to read full particulars in regard to this disease reference must be made to the general index at the back of the book, where reference will be found to special articles on the disease.

TABLE OF SYMPTOMS FOR DIAGNOSIS

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Abdomen— Swelling of.	1 Picking at the nose; itching about anus; grinding of teeth in sleep.	Worms	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Abdomen— Painful urination.	2 Pain in lower part of the abdomen; urine scanty, high colored, even bloody, sometimes with mucus or pus; much straining with sometimes but a few drops passed at time.	Inflammation of the Bladder. (Cystitis.)	
Abdomen— Intense pain.	3 Pain increased by slightest pressure even of bedclothes; high temperature; rapid, wiry pulse; inclination to draw up the legs in relaxation of the abdominal muscles; abdomen tense from distension; pinched and anxious appearance of face; skin cold and clammy.	Inflammation of the Bowels. (Peritonitis.)	
Abdomen— Pain when urinating.	4 Severe pains in one loin extending to the hip on the same side and running down the groin to the bladder; frequent urination; stream suddenly interrupted after starting; pain or crawling sensation at head of penis (males) or in the vagina (females); bloody urine; sometimes nausea and vomiting.	Gravel or Stone in the Bladder. (Calculus.)	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	5		
Abdomen— Sensation of burning in stomach.	Colicky pains in abdomen, with looseness of bowels, sometimes vomiting; headache; depression of spirits; later griping pains are felt; faintness and depression over heart; pulse weak, may be absent at wrist; copious purging of thin, watery matter, sometimes tinged with blood; violent vomiting; sensation of burning in stomach; in a few hours there follow coldness and dampness of whole surface of body, lividity of lips, cold breath, an unquenchable thirst; feeble, rapid pulse; difficult respiration; suppression of kidney secretion.	Asiatic Cholera.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
	6		
Abdomen— Rupture.	Protrusion of some portion of the bowel or any abdominal viscera through the wall of the abdomen, commonly known as rupture, is so well known that it is unnecessary to give symptoms, but there is a form known as strangulated hernia, which may occur with anyone suffering from rupture. In ordinary rupture a little loop of intestine escapes in a small pouch; if this intestine loop becomes crowded into the pouch, so as to be tightly squeezed, the bowels cannot act and there is danger of mortification. There is intense pain, not only in the neighborhood of the rupture, but over the whole abdomen, especially around the navel; obstinate vomiting and cessation of passages from the bowels; vomiting persists in spite of all remedies and results in bringing up fecal matter through the throat, being a curious phenomena only known to occur in strangulated rupture.	Hernia and Strangulated Hernia.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Anus— Irritation of.	7 Itching about anus; grinding teeth in sleep; picking at nose; with or without swelling of abdomen.	Worms.	
Anus— Protrusion of mucous lining.	8 Much pain and tenderness of the part; fever; restlessness.	Falling of the Bowels. (Prolapsus Anus.)	
Anus— Itching and pricking.	9 Peculiar sickening sensation when at stool; feeling of obstruction in rectum; sometimes bleeding and if this be copious it gives temporary relief.	Piles. (Hemorrhoids.)	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Anus— Fissure of.	10 Itching pain and fullness about rectum; cuts or channels from anus into rectum; discharge of pus which is frequently of offensive odor.	Fistula.	
Appetite— Voracious.	11 Great thirst; marked loss of weight and strength; anemia; passing of excessive quantities of pale urine; sweetish breath.	Diabetes.	
Appetite— Voracious.	12 Severe pain extending upward from region of the navel; pain relieved by eating; nausea, sometimes vomiting; often diarrhœa; itching at nose; loss of weight. Sometimes the passing of a yellowish or whitish flat, flexible substance, either with stools or otherwise.	Tape Worm.	
Bed-Wetting.	13 See Urine, Incontinence of, No. 226.		

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	14		
Back— Pain in the lower part.	Pain severe, but spasmodic; relieved if restful in one position, but suddenly acute upon making any movement affecting the muscles of the back, such as turning in bed, or rising from a chair.	Lumbago (Muscular Rheumatism).	
	15		
Back— Pain and tenderness in small of.	Pain and tenderness also in loins, extending down inside of limbs; constant desire to urinate and inability to retain; urine hot, dark and bloody.	Inflammation of the Kidneys.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
	16		
Back— Dull pain.	Dull pain over kidneys, extending downward; frequent passage of scanty, high-colored and albuminous urine of high specific gravity; puffy face; chills followed by fever.	Acute Bright's Disease.	
	17		
Back— Intense pain.	Sharp, intense pain in region of kidneys radiating downward toward the groin; nausea and vomiting may occur; cold sweats; in males the testicle on affected side drawn up.	Stone in Kidney (Renal or Nephritic Colic).	
	18		
Back— Neuralgic pains.	A dragging sensation in the back; sharp pains shooting from the back down to the groin; uneasy feeling in both sides; sometimes hysteria; relief obtained while lying down but pain returning on rising.	Floating or Movable Kidney.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Back— Spinal sensations.	19 Intermittent sensations of pain and tenderness over the spinal column, radiating to the chest and extremities; convulsive twitchings; sometimes hysteria; mental lassitude; muscular weakness; wakefulness; sometimes derangement of sexual functions.	Nervous Prostration (Neurasthenia).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Bowels— Swelling of.	20 Tenderness over bowels; slight fever; mucous or blood passages; colicky pains; constant desire to defecate; stools of bloody slime, having peculiar offensive odor.	Dysentery.	
Bowels— Confined.	21 Irregular action, one day costive, next relaxed; pain in right side; coated tongue; headache.	Liver Complaint (Hepatitis).	
Bowels— Relaxed.	22 Griping pains in stomach, sometimes twisting; coated tongue; fever; tenderness of stomach; frequent loose, watery stools.	Diarrhœa.	
Bowels— Costive.	23 Vomiting, tenderness; pain; thirst; quick, high pulse.	Inflammation of the Bowels.	
Bowels— Burning pain in.	24 Cold, clammy skin; small, weak pulse; collapse; violent vomiting and diarrhœa.	Cholera Morbus.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	25		
Bowels— Infantile.	Relaxed; great pain; feverishness and thirst; head hot; tenderness of abdomen.	Cholera Infantum.	
	26		
Body— Pain, liver and right shoulder.	Hectic fever, high in the evening and low in the morning; chills sometimes present; pain is variable and may be felt in back of right shoulder; liver is enlarged, painful and tender; marked jaundice is rare; there may be bulging which is apt to vary at different times.	Abscess of the Liver.	
	27		
Blood— Poisoning of.	Poisoning of the blood which may come from internal causes or be introduced into the system through external wounds, give symptoms of chill, followed by high fever; profuse sweating; great prostration, delirium, etc. There may or may not be abscesses.	Blood Poisoning (Septicemia and Pyemia).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
	28		
Breath— Offensive.	Constipation; headache; pain in head and right shoulder.	Liver Complaint.	
	29		
Breath— Shortness of.	Fatigue on slight exertion; loss of weight, debility; loss of appetite; anæmia; hectic flush in cheeks; hacking cough with considerable expectoration; night sweats.	Consumption (Pulmonary Tuberculosis).	
	30		
Breathing— Rapid.	Sudden hard chill and sharp pain in side; high fever; short dry cough with brownish or blood-stained sputum.	Pneumonia (Congestion of the lungs).	
	31		
Breathing— Laborious (Children).	Usually sudden attack at night; child gasps for air and breathing causes a peculiar whistling sound; barking cough; hoarse whispering voice; muscular contractions of fingers and toes; sometimes convulsions	Croup.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Breathing—Difficult.	32 Inspiration short and jerky; expiration inordinately prolonged; breathing produces a wheezing or whistling sound; face pallid and distressed.	Asthma.	
Breathing—Painful.	33 Pronounced chill followed by fever; sharp, stabbing pain in the side, aggravated by motion, coughing or attempt to take long breath; pain usually high up in region of nipple, but may extend to the shoulder, armpit and back; painful cough accompanied by expectoration streaked with blood and sometimes pus; vomiting; tongue parched; decided thirst; urine scanty and high-colored.	Pleurisy.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Breathing—Spasmodic.	34 Palpitation or throbbing of the heart; occasional short, sharp pains in the region of the heart; swelling of the feet, particularly in the evening.	Heart Disease (Endocarditis, Pericarditis, or Carditis).	
Breathing—Spasmodic.	35 Irregular beating of the heart, which sometimes seems to pound.	Palpitation of Heart.	
Breathing—Affected by exertion.	36 Irregular, feeble and slow pulse; heart beats almost imperceptible; vertigo; frequently severe pains in chest; pallid face; enfeebled muscular power; cold feet and hands; swelling of feet.	Fatty Degeneration of the Heart.	
Chest—Contraction of.	37 Short, dry cough; hectic fever; night sweats; general debility; loss of appetite; constipation.	Consumption (Pulmonary Tuberculosis).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	38		
Chest— Feeling of rawness.	Aggravated by coughing and feeling of rawness extending through chest into the back; severe cold in head; shortness of breath; husky voice; wheezy respiration; inflamed throat; barking cough; coated tongue; fever; full pulse.	Bronchitis.	
	39		
Chest— Sharp pains in.	See Breathing, No. 33.	Pleurisy.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
	40		
Chest— Whooping cough in.	For week or ten days, symptoms of an ordinary cold, with cough, slight fever, etc. Cough gradually increases and assumes a spasmodic character; paroxysms consist of a series of short, expulsive soughs, in which child often becomes blue in the face and apparently on the verge of suffocation, when a long-drawn, noisy, whooping inspiration occurs; expectoration of thick, stringy mucus, often with vomiting and sometime with hemorrhages from nose, lungs, and so forth; several attacks may follow in close succession, followed by a respite of varying length.	Whooping Cough.	
	41		
Chest— Inflammation of the breast.	Uneasiness of the breast in either male or female followed by a chill and usually fever; gland becomes intensely swollen, red and exceedingly painful; inflammation may be so great as to cause an abscess.	Mastitis or Mammitis.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Chest— Cancer of the breast.	42 When a woman discovers a lump in the breast she should at once consult a physician as, although it may be a simple matter, it may, on the other hand, be the first indication of a cancerous growth.	Cancer of the Breast.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Chills— With short breathing.	43 Lancinating pain on one side of the chest; dry cough; difficulty of lying on affected side.	Pleurisy.	
Chills— Swelling of throat and tonsils.	44 Headache; fever; high pulse; hoarseness; dry skin; ulcerated sore throat.	Tonsilitis.	
Chills— Vomiting.	45 Fever; backache; whitish ulcers in throat; vomiting; great prostration.	Diphtheria.	
Chills— Violent pain in abdomen.	46 Pain increased by slightest pressure, even the bedclothes; nausea; dry tongue; full, hard pulse.	Peritonitis.	
Chill— With shortness of breath.	47 Chill followed by pain; pulse quick and hard; pain aggravated by cough.	Pneumonia.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Chill— With intense headache.	48 Sore throat; pain in chest; nausea; scarlet rash in about forty-eight hours, face, neck, throat and limbs.	Scarlet Fever.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Chill— Followed by watery eyes.	49 Headache; vomiting; rash usually comes on early, generally first or second day; nausea; dry, irritating cough.	Measles.	
Chill— Pain at pit of stomach.	50 Tongue and teeth coated with a dark brown fur; headache; vomiting; clammy perspiration.	Typhus Fever.	
Chill— Pain in head and limbs.	51 Slight prostration; skin hot and dry; pulse rapid; temperature high; frequently diarrhœa.	Typhoid Fever.	
Chill— Pain in muscles of neck, back and legs.	52 Great prostration; severe pains in head; sneezing; hoarseness; paroxysmal hard cough; impaired breathing; running from nose; acute nervous symptoms; severe gastric disturbance.	La Grippe (Influenza).	
Chills—	53 In addition to the foregoing specific diseases which commence with chill it may be stated that almost all acute diseases start with chills or chilly sensations.		
Cough— Deep, hoarse.	54 See Chest, No. 38.	Bronchitis.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Cough— Quick, distressing.	55 See Breathing, No. 30.	Pneumonia..	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Cough— Hacking.	56 See Breath, No. 29.	Consumption (Pulmonary Tuberculosis.)	
Cough—	57 In addition to being a symptom in the foregoing diseases, cough is frequently an accompaniment of many other ills.		
Constipation—	58 Descent or protrusion of mucous membrane of the lower bowel through the anus; straining at stool.	Prolapsus Anus.	
Constipation—	59 Veins of rectum distended in little lumps which may be within the rectum or may protrude at the anus; sometimes hard and sore, sometimes bleeding, generally accompanied by an irritating itching of the part.	Piles.	
Delirium— At onset.	60 Coldness of body and limbs; nausea; intense thirst; severe pains in head; spots on body, bleeding at touch.	Spotted Fever (Cerebro-spinal Fever).	
Diarrhœa— Violent pain at navel.	61 Bowels hot and tender to pressure; a blue line on the gums.	Painter's (Lead) Colic.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Diarrhœa—	62 Diarrhœa in more or less severe form is also an accompaniment in other diseases than those above specifically mentioned.		
Dizziness— Pain in right side and shoulder.	63 Bowels irregular, one day costive, the next relaxed; feverishness; tongue coated.	Liver Complaint.	
Ears— Ringing in.	64 Violent pain in head; redness of eyes; flushing of face; fever; constipation; delirium.	Meningitis.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Ear— Swelling behind.	65 Inflammation with pus; severe pain.	Mastoiditis.	
Eruptions—	66 See Skin, Nos. 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 190, 191, 192, 193, 194, 195, 196, 197, 201, 202, 203, 204.		
Expectoration— Slimy and blood-stained.	67 See Breathing, No. 30.	Pneumonia.	
Expectoration— Frothy blood.	68 Preceded by cough; difficult breathing; salty or sweetish taste; blood may be coughed up in small quantities or come with a gush.	Hemorrhage of the Lungs.	
Expectoration— Dark, clotted blood.	69 Usually occurring with vomiting caused by eating.	Hemorrhage of the Stomach.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Face— Puffy.	70 See Back, No. 16.	Bright's Disease.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Face— Yellow.	71 Yellow skin, yellow urine and whites of eyes especially yellow; nausea; vomiting; dizziness; feces pasty and light in color.	Jaundice.	
Face— Shooting pains in.	72 Stabbing or shooting pains in head or face; usually confined to some particular area, but may be general.	Facial Neuralgia.	
Face— Swollen.	73 Swelling of the Parotid Gland; in front and beneath the ear, sometimes extending to breasts and testicles; pain when chewing and swallowing.	Mumps.	

TABLE OF PULSE AND TEMPERATURE

In all illness where fever is present there not only is a rise of temperature, but quickened circulation, a change of tissue and disorded secretion. Rise of temperature is a predominant feature. The height of fever may always be determined by the use of the clinical thermometer. When temperature is in excess of normal (98.6) degrees, but is under 100 degrees, the patient is spoken of as being feverish; from 100 degrees to 101 degrees, as having slight fever; 102 degrees to 103 degrees, moderate; 104 degrees to 105 degrees, high; in excess of 105 degrees, intense.

As a general rule, circulation is quickened much in the same ratio as is the temperature, one degree Fahr. usually showing an increase of from eight to ten beats of the pulse per minute. A fairly accurate comparison between temperature and pulse may be made from the following table:

A temperature of	98 degrees F.	corresponds to a pulse of	60
A temperature of	99 degrees F.	corresponds to a pulse of	70
A temperature of	100 degrees F.	corresponds to a pulse of	80
A temperature of	101 degrees F.	corresponds to a pulse of	90
A temperature of	102 degrees F.	corresponds to a pulse of	100
A temperature of	103 degrees F.	corresponds to a pulse of	110
A temperature of	104 degrees F.	corresponds to a pulse of	120
A temperature of	105 degrees F.	corresponds to a pulse of	130
A temperature of	106 degrees F.	corresponds to a pulse of	140

Tissue waste is usually proportionate with the severity and duration of the fevered condition, being almost absent in slight fevers, but excessive in prolonged fevers, such as Typhoid. Disordered secretions are indicated by salivary, gastric, intestinal and urinal deficiency, causing furred tongue, clammy mouth, excessive thirst, constipation and scanty, high-colored, and commonly acid urine.

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	74		
Fever— Eruptive.	Violent chill in adults and convulsions in children; intense frontal headache, agonizing lumbar pains and vomiting; high fever from commencement; delirium usually present and frequently violent; face flushed; eyes bright and clear; eruption of small red spots, appearing on the third or fourth day, first on forehead and wrists and rapidly spreading over the face and body.	Small-pox.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Fever— Eruptive.	75 Slight fever accompanied by chills, vomiting, headache, and pain in back and legs; an eruption which is the most marked feature comes out during the first day, usually appearing first on chest or back in the form of red spots, sometimes first appearing on forehead; in light cases there may be only one or two spots.	Chicken-pox.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Fever— Eruptive.	76 Chill; vomiting; high fever; on second day scarlet eruption appears first on chest and rapidly spreads over the body; tongue coated; quick pulse; sore throat; ash-gray patch on palate.	Scarlet Fever.	
Fever— Eruptive	77 Symptoms of cold in head with feverishness, headache and nausea, shortly followed by cough. These persist with increasing fever until fourth day when eruption appears, beginning on forehead, neck and face and within twenty-four hours extending over entire body; eruption in form of slightly raised red spots resembling fleabites, which disappear momentarily upon pressure, becoming confluent as disease progresses and forming continuous patches of dusky redness.	Measles.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	78 chilliness, followed by fever, vomiting, intense headache, vertigo, painful muscular stiffness, soon developing into continuous spasms, particularly affecting the muscles of the head and back; breathing rapid; pulse irregular, varying from 30 to 40 beats within a few hours. In malignant cases there is usually a rash.		
Fever— Sometimes eruptive.		Spotted Fever (Cerebro-spinal Fever).	
	79 Onset three to five days after incubation, attack usualy sudden, frequently a night after retiring in usual health; temperature rises in a few hours to 103 degrees and in one or two days may reach 106 or 107 degrees; skin becomes dry and hot; countenance indicates utter helplessness and prostration; usually pain in the head, back, limbs and small joints, which latter swell up as in Rheumatism; rapid pulse; loss of appetite; coated tongue; slight nocturnal delirium; concentrated urine. The pain may be so severe that the patient cannot move. First stage lasts about forty-eight hours, but may vary from twelve hours to three days, when symptoms subside and there is a period of two or three days remission, general debility and muscular pains predominating and fever usually absent, but on fourth day reappears; on fifth or sixth day an eruption develops, which is sometimes more like the flush of erysipelas than the		For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Fever— Eruptive.		Break-Bone Fever (Dengue).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	papules of Measles or Scarlet Fever, though the color is not so intense. The eruption spreads over the whole body. When it reaches its height, painful swellings of the lymphatic glands of neck, back of head, armpits and groins occur, the nose, mouth and throat becoming implicated, swelling up and growing excessively painful. On the seventh or eighth day scaling commences and the acute stage terminates.		
Fever— Eruptive.	80 Violent headache; transient shiverings; palpitation of the heart; irregularity of the pulse; vomiting; difficulty in breathing; spitting of blood; syncope or fainting; pale face; apathetic expression, eyes dull and pupils dilated; patient lies three or four hours in state of absolute prostration, then has violent fever with delirium, during which urine is suppressed and bowels constipated; dark purplish spots, from one-tenth of an inch to one inch in diameter, appear over the body, exhaling a peculiar odor somewhat resembling honey.	Bubonic Plague.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Fever— Non-eruptive.	81 Moderate fever elevation rarely exceeding 103 degrees; frequent pulse; flushed face; headache; sense of lassitude and weariness; loss of appetite; nausea and restlessness; in children perhaps delirium; termination usually sudden on third or fourth day. Smyptoms much like those of Typhoid, but Diarrhœa and other symptoms are absent.	Ferbicular or Ephemeral Fever.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Fever— Non-eruptive.	82 Slight chill or chilly feelings, followed in a few hours by headache, quickened pulse, rise in temperature and constipation; frequently nausea and sometimes vomiting during first twelve or twenty-four hours; sometimes a slight eruption of Roseola or Prickly Heat about the loins and over the back; sometimes delirium, especially at night; fever usually subsides without further derangement of the system than copious and debilitating perspiration, or perhaps an outbreak of vesicles of Herpes, commonly called cold sores about the face or elsewhere.	Protracted Simple Continued Fever.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Fever— Non-eruptive.	83 Incubation period short, attacks may occur promptly after exposure, but usually from five to eight days; onset generally abrupt without preliminary symptoms; fever severe, but of short duration, and when over the patient is left comparatively well for a few days; after interval of about a week there is another attack; onset of malady is marked by chill or shivering fit, severe headache, vomiting and often jaundice; white, moist tongue; tenderness over pit of stomach; constipation; enlarged liver and spleen; high-colored urine; frequent, full and often bounding pulse; pains in back and limbs; frequently delirium.	Relapsing Fever (Febris Recurrence).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Fever— After childbirth. Non-eruptive.	84 Violent chill third or fourth day after delivery; great thirst and extreme prostration; fever may run very high; uterine discharge becomes very foul and the odor nauseating; delirium.	Child-bed Fever (Puerperal Fever).	
Fever— Non-eruptive.	85 Indisposition and general debility for a week or two without any predominating symptoms, yet usually accompained by a certain feeling of chilliness and a slightly feverish condition, then temperature rises more rapidly, reaching 103 or 105 degrees; continual headache; constipation, followed by diarrhœa; weak, rapid pulse; unnatural respiration; slight cough; dull, apathetic face; general listlessness; tremulous tongue; pain in lower part of abdomen, on which may be found rose-colored spots; watery stools, quickly developing to severe diarrhœa; delirium.	Typhoid Fever.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Fever— Non-eruptive.	86 Chill and general chilliness followed by fever; headache; backache; tongue coated; occasionally looseness of bowels, but generally the reverse; sometimes, but not always, vomiting. Fever usually continues three of four hours, but may vary from one to twelve hours and is then followed by a sweating stage. Patient feels weak, languid and depressed. The attack over, it returns periodically, usually every other day or every third day.	Malarial Fever (Ague.)	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Fever— Non-eruptive.	87 Sometimes prolonged chilliness and in other cases chill hardly perceptible; rise in temperature usually slow; face pallid at commencement, but gradually becoming flushed as fever rises; frontal headache; nausea; belching; sometimes delirium at night; eyes more or less yellow; urine dark and cloudy. Duration of attack is usually twenty hours or longer; reoccurrence at uncertain intervals, sometimes every twenty-four hours, sometimes forty-eight hours or longer.	Remittent Fever.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Fever— Non-eruptive.	88 Chill followed by intense fever; jaundiced face and anxious countenance; scanty, albuminous urine of high color, sometimes almost completely suppressed; rapid pulse; high temperature; profuse vomiting, matter vomited being of coffee color, frequently called black vomit; watery and somewhat reddened eyes; mind usually clear.	Yellow Fever.	
Fever— Non-eruptive.	89 Fever occurs in connection with many other ills. Whenever normal conditions of the body are disturbed fever is a possible symptom and therefore other symptoms must be taken into consideration therewith.		

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Head— Unnaturally large.	90 Dull, languid child; capricious appetite; irregular bowels; pale, unhealthy stools; emaciated limbs; tumid belly; face full and head disproportionately large, forehead projecting and the sutures of the cranium remaining open, sometimes expanding; extremities of the long bones swollen out into knobs; legs bent outward at knee; chest deformity.	Rickets.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Headache—	91 Headache may be due to some local disturbance, such as might be caused by overeating, or it may be one of the symptoms of many different diseases.		
Heart— Palpitation of, without other noticeable symptoms.	92 This may be a symptom of heart disease, but commonly it is due to some functional disorder without disease of the heart of any kind. It often thus occurs in anæmia and is not uncommon in dyspepsia. It is sometimes caused by the use of tobacco, alcohol, strong tea or coffee.	Anæmia; Dyspepsia; Nervous Disorder.	
Heart— Palpitation of, with swelling of feet.	93 Shortness of breath; swelling of feet, especially in the evening; occasional pains over the heart region.	Endocarditis; Pericarditis; Carditis.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Heart— Slow action accompanied by difficult breathing, etc.	94 Heartbeats almost undiscernable; pulse slow, irregular and feeble; difficult breathing, especially on exertion; dizziness and sometimes attacks of faintness; frequent pain in the heart region; cold hands and feet; slight swelling of feet with stout people; poor digestion; weak muscular power.	Fatty Degeneration of the Heart.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Heart— Shooting pains.	95 Agonizingly sharp pains, chiefly on the left side in the heart region, but sometimes extending to both sides of chest and to shoulders and arms. Pain generally of short duration, but during occurrence arouses fear of death.	Angina Pectoris (Neuralgia of the Heart).	
Heartburn—	96 With uneasy, rather distressing feeling in stomach; sometimes belching.	Indigestion.	
Heartburn—	97 With griping pains; belching; retching; vomiting; tenderness at pit of stomach; looseness of bowels.	Cholera Morbus.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Insensibility— With premonitory symptoms.	98 Flushed appearance of face and eyes; heated head; throbbing of carotid arteries; distension of temporal arteries and jugular veins; constipation; languor; dullness; drowsiness; dimness of sight; vertigo; headache. Attack marked by sudden stupor, slow and sometimes stentorious breathing; full slow pulse; dusky or turgid appearance of face. In sensibility may be of short duration; slight convulsive movements not uncommon; paralysis of muscles for short time after attack. Attack may prove fatal, but usually there is recovery.	Congestive Apoplexy.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Insensibility— Without clear premonitory symptoms.	99 Sudden attack or stroke; individual falls insensible without warning; duration of insensibility may be seconds, minutes or hours; upon return to consciousness there is general or local paralysis, usually on but one side; mental powers commonly impaired. During attack breathing usually stentorious; pulse slow and full; head hot and face dark or flushed; eyes dilated or one dilated and the other contracted; mouth usually drawn away from affected side of face.	Hemorrhagic Apoplexy.	
Insensibility— Epileptic.	100 Victim feels a peculiar premonitory sensation commencing in a finger or toe, utters a sharp cry and falls suddenly to the floor, with partial or complete loss of consciou-	Epilepsy.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	ness. Then follows frothing at mouth; biting of the tongue; clenching of fingers; face becomes bluish; pupils dilated; stupor for a varying period. There is soreness, weakness and mental confusion on return to consciousness.		
Insensibility— Feigned; hysteric.	101 A "fit of hysterics" may vary from mere uncontrollable laughter to severe convulsions in which epilepsy is simulated, but the patient usually falls in a comfortable place and while feigning unconsciousness is in reality quite aware of what is going on.	Hysteria.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Insensibility— Cataleptic.	102 State of trance; patient apparently insensible and sometimes having the general characteristics of death; breathing suspended; limbs remain in any position placed; patient is powerless to speak or make movement of any muscle, yet is mentally conscious of all that takes place. There is danger of burying patient alive while in this state.	Catalepsy.	
Itching— Eruptions.	103 Very severe itching of small, pointed vesicles which usually first appear on the wrists and between fingers, but if not at once eradicated quickly spread to any and all parts of the body excepting the face; itching always worse at night, when it becomes almost unbearable. Extremely contagious.	Itch (Scabies).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Itching— Of blistery patches.	104 Intense itching of blistery patches on the skin in any part of body, but especially about the flexures of the joints; the blisters break and exude a serous fluid, which dries into thin yellow crust. The itching at times is so severe that it is impossible to avoid scratching which aggravates the trouble. Not contagious.	Eczema (Moist Tetter).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Itching— At rectum.	105 Itching in and about anus; veins of rectum distended in little lumps, sometimes within the rectum and sometimes outside; when within the rectum usually burst and bleed, which affords relief, but when outside the lumps simply grow larger and harder and the pain and itching becomes intense.	Piles.	
Itching— At rectum and nose.	106 Itching at the nose and in neighborhood of the anus; swelling of abdomen; offensive breath; grinding of teeth in sleep.	Worms.	
Joints and Muscles— Stiffness, accompanied by prostration and vomiting.	107 General feeling of debility and discomfort; loss of appetite; nausea and vomiting; diarrhœa; prostration; sensation of stiffness about neck, arms and legs; high fever; frequent pulse; copious, offensive perspirations, although the temperature of body does not reach high elevation; stiffness of limbs increases and muscles become more painful and swollen, being very sensitive to the touch; about end	Trichiniasis.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	of first week, edematous swelling of the eyelids and root of the nose, which are characteristic; sometimes severe hiccough, hoarseness and loss of voice; if the case be severe a paralyzed condition of the muscles may occur.		
Joints and Muscles—Inflammation of.	108 Chills and fever followed or accompanied by pain, heat, redness and swelling of one or more joints, with tendency to leave one point suddenly and fasten upon another; sore throat; irregular fever; acid sweats; tendency to attack the heart; larger joints, such as hips, knees, wrists, ankles, are more generally the seats of trouble than are the smaller joints.	Acute or Inflammatory Rheumatism, or Rheumatic Fever.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Joints and Muscles—Swollen and painful.	109 Stiff, swollen painful joints, aggravated by motion; no general fever and appetite may be good and digestion sound; smaller joints commonly attacked, sometimes rendering them permanently swollen and deformed and causing atrophy of the muscles connected with them.	Chronic Rheumatism.	
Joints and Muscles—Pain in muscles.	110 Generally located in either the neck, the back or the side; pain severe but spasmodic; relieved if restful in one position, but suddenly acute upon any movement affecting the muscles concerned.	Stiff or Wry Neck; Lumbago; Pleurodynia.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Joints and Muscles—Occasional painful affection of the smaller joints.	111 Indisposition, sometimes impaired digestion, nausea and vomiting with light fever, suddenly followed by an acute pain in one of the smaller joints, usually the big toe. The pain is intense during attack, but the attack is usually of short duration. After one attack there is generally reoccurrence at more or less frequent intervals.	Acute Rheumatic Gout.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Joints and Muscles—Chronic affection of smaller joints.	112 Constant or semi-constant painful swelling and immobility of smaller joints, which sometimes become permanently deformed. Pain is absent and swelling less for more or less longer periods, but suddenly returns in full severity after slight exposure to cold and moisture, excess at table or vivid emotions. There is tendency for pain to suddenly leave one joint for another.	Chronic Gout.	
Joints and Muscles—Stiffness in jaw muscles.	113 Stiffness of the jaws; rigidity of muscles; arching of the body upon the neck and heels; difficult respiration; chewing of food impossible.	Lock-jaw (Tetanus).	
Kidneys—	114 See Nos. 11, 15, 16, 17, 18, 70, 71, 160, 189, 222, 223, 224.		
Lungs—	115 See Nos. 29, 30, 37, 47, 55, 56, 67, 68, 163.		

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Menses— Painful.	116 Griping pains, colic and cramps at time of menses; sometimes convulsions.	Painful Menstruation (Dysmenorrhea).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Menses— Excessive.	117 Excessive flow of blood at the regular monthly periods.	Excessive Menstruation (Menorrhea).	
Menses— Deficient.	118 Small flow of blood, continuing perhaps only one or two days and sometimes occurring at six weeks or other irregular periods.	Partial Amenorrhea.	
Menses— Whitish discharge.	119 Discharge whitish, thick and gelatinous or thin and milky.	Leucorrhea (The Whites).	
Menses— Cessation of.	120 Morning sickness; enlargment of the nipples; darkening and increase in size of the areolas.	Pregnancy.	
Menses— Irregularity and final cessation.	121 Irregularity in menstrual flow after forty-five years of age (occasionally earlier); intervals extended to five six or seven weeks; period last longer; nervous headache; insomnia; general disarrangement of nervous system; sometimes disorders of digestive system and mind sometimes affected.	Change of Life (Menopause or Amenorrhea).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Menses— Anæmic.	122 Pale and scanty menses, sometimes none; pale face, bloodless lips; easily fatigued; restless nights; capricious appetite; longing for sharp and acid foods or for slate, chalks and so forth.	Green Sickness (Chlorosis).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Menses— Discharge.	123 Sudden coming on of greenish-yellow discharge accompanied by burning pain at urination.	Gonorrhea.	
Mouth— Bad taste in.	124 Offensive breath; headache; heavy stupid feeling; dizziness; coated tongue.	Biliousness.	
Mouth—	125 Rising of water or food to mouth.	Heartburn (Waterbrash).	
Mouth— Inflammation of.	126 General redness; areas of marked congestion where irritation is most intense; painful mastication.	Acute or Simple Stomatitis.	
Mouth— Small ulcers in.	127 First characterized by small red spots or vesicles, which may rupture, leaving small ulcers, surrounded by a red area. Usually occurring in children under three years of age.	Aphthous Stomatitis or Follicular Stomatitis.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Mouth— Ulcerated.	128 Attacks both adults and children, but particularly children after first dentition. Low condition of nutrition; gums of lower jaw chiefly affected, being swollen red and spongy. There is increased salivation; teeth become loose; the breath foul and mastication painful.	Putrid Sore Mouth or Ulcerative Stomatitis.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Mouth— Fungus growth in.	129 Slightly raised pearly spots on the tongue which spread and coalesce, sometimes covering the whole membrane lining of the mouth. The fungus growth may be scraped off and examined under the microscope, when it is readily recognized.	Parasitic Stomatitis or Thrush.	
Mouth— Ulcerated with proud flesh.	130 Of rare occurrence. Usually follows one of the specific fevers, especially measles and whooping cough. The mucous membrane is first affected, usually of the gums or of one cheek. The process is gradual; externally the cheek is swollen, hard, red and glazed; inside the mouth there is an ulcer with a great deal of proud flesh or slough.	Gangrenous Stomatitis, or Cancrum Oris, or Noma.	
Mouth— Salivation of.	131 Tenderness of the gums, manifested by forcibly bringing the teeth together; redness of the gums near the insertion of the teeth; a metallic taste and increased flow of saliva. Unless checked symptoms become accentuated with profuse flow of saliva, foul breath, tenderness. Sometimes there is ulceration.	Mercurial Stomatitis or Salivation.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Mouth— Vesicles in.	132 Vesicles containing a yellowish matter on the mucous membranes of the lips and tongue and sometimes in the hard palate; burning senation in mouth; painful swelling; speech and swallowing difficult; copious salivation; later appearance of vesicles between fingers and toes and around nails; feverish condition; loss of appetite.	Glanders.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Mouth— Inflammation of gum.	133 Usually in connection with the root of a tooth which may be ulcerated, causing great pain, which is generally relieved after three or four days by discharge of matter or pus.	Inflammation of the gum.	
Mouth— With abscess from ulcerated tooth.	134 A boil or abscess forms in the gum in proximity to the tooth affected. There is great pain until the boil is surgically treated or naturally bursts. Do not apply poultices to outside of face as there is danger of forcing it to break outward through the cheek.	Gumboil (Alveolar Abscess).	
Nausea—	135 Nausea occurs in respect of so many slight ailments and is an accompaniment of so many different diseases that it becomes necessary to diagnose from other symptoms, not losing sight of the fact, however, that nausea is present.		

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Nose— Offensive discharge from.	136 Sneezing; pain in forehead; huskiness of voice; soreness of throat; irritation along the nasal passage to the head; excessive and offensive discharge.	Acute Nasal Catarrh.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Nose— Formation of fetid crusts in.	137 Dried secretions or crusts form on the nostrils emitting a peculiar stench. The condition is accompanied by burning, itching and dryness, causing great discomfort to the sufferer.	Chronic Nasal Catarrh (Fetid Catarrh or Ozena).	
Nose— Grape-like tumors in.	138 These tumors form in the upper part of the nose; when small they may present no decided symptoms, but if they become large usually cause obstruction to the respiration, pervert the nasal secretions, give a nasal twang to the voice and in some cases provoke asthmatic attacks.	Nasal Polyps (Grape-like Tumors).	
Nose— Redness and thickness of.	139 See Skin, No. 177.	Acne Rosacea.	
Nose— Running of, snuffling, etc.	140 Severe cold in the head, constant sneezing, great discharge from nose, and in many cases difficulty in breathing; slight cough; feverishness; eye and tear ducts affected, causing a watery state of the eyes. It is a complaint of the summer months.	Hay Fever (Hay Asthma; Summer Catarrh; Rose Cold).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Ovaries— Severe pain in side.	141 Fever; severe pain on affected side, which is increased in walking or standing; patient prefers lying on back with knees drawn up; lower part of the abdomen extremely sensitive; menstruation as a rule painful, pains coming on a few days before the flow.	Inflammation of the Oviducts (Salpingitis).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Ovaries— Extreme sensitiveness of abdomen.	142 Excruciating pain low down in the abdomen near the groin; pain often shoots down the leg of affected side and may extend into the back and hip; lower part of abdomen extremely sensitive, even weight of bedclothing giving rise to distress; fever; urination and bowel movements usually accompanied by more or less pain.	Inflammation of the Ovary (Ovaritis).	
Ovaries— Lump on affected side.	143 Attention first called by one side of the abdomen being larger than the other and later a lump may be felt on that side, which rapidly increases in size, the whole abdomen becoming distended and resembling pregnancy, for which it is oftenmistaken; later on there is sensation of weight in the pelvis, bowel movements become painful and the bladder very irritable; painful and profuse menstruation are common. Later there is swelling of the legs, privates may become swollen and there is shortness of breath; pain more or less constant and at times violent in character.	Tumors of the Ovary.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Pain in Body—(Abdominal region) With slimy stools.	144 Chill; slight fever; tenderness over bowels; urgent desire for stool; defecations of bloody slime, having a peculiar offensive odor.	Dysentery.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Pain in Body—(Abdominal region) With watery stools.	145 Griping pains in bowels; nausea; flatulence; loose and watery stools; coated tongue; tenderness of stomach.	Diarrhœa.	
Pain in Body—(Abdominal region) Tense pain increased by slightest pressure.	146 See Abdomen, No. 3.	Inflammation of the Bowels (Peritonitis).	
Pain in Body—(Abdominal region) Without diarrhœa.	147 Griping, twisting pains, radiating from the navel and relieved by pressure. Care must be taken not to confuse with strangulated hernia, gall stone, gravel and other serious diseases, also not to mistake these latter for colic.	Intestinal Colic.	
Pain in Body—(Abdominal region) Sometimes with Vomiting and diarrhœa.	148 Paroxysmal pains in the bowels of sharp, griping, tearing, cutting or knawing character; heavily-coated tongue; headache; sometimes jaundice and frequently vomiting or diarrhœa.	Bilious Colic.	
Pain in Body—(Abdominal region) With green discharge.	149 Severe, writhing pain, aggravated by slightest pressure; diarrhœa with green discharge of foul odor.	Flatulent or Inflammatory Colic.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Pain in Body—(Abdominal region) With constipation and vomiting.	150 Paroxysmal followed by continuous pain in neighborhood of stomach; vomiting; constipation; pain in limbs; blue line around gums.	Lead Poisoning (Painter's Colic).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Pain in Body—(Abdominal region) Vomiting; clammy skin.	151 See Bowels, No. 24.	Cholera Morbus.	
Pain in Body—(Abdominal region) Vomiting; Jaundiced appearance.	152 Pain in right side, sometimes shooting to breast bone, shoulder blade or right arm; urine dark and clouded; jaundiced face and eyes; bitter taste in mouth; vomiting; irregular action of bowels, one day costive and next relaxed.	Hepatitis (Liver Complaint).	
Pain in Body—(Abdominal region)	153 General indisposition for two or three days; onset is uusually with colicky pains which at first may be general over whole abdomen, but particularly around navel; by second day pain distinctly located in appendix region (see manikin); right leg drawn up; rapid pulse; fever; nausea, vomiting; constipation; tenderness.	Appendicitis.	
Pain in Body—(Abdominal region) With tenderness of groin.	154 Premonitory symptoms are: Pain in groin with a dragging sensation; backache; fever. These are followed by swelling of the testicles accompanied by sharp shooting or aching pains in testicles, which become hard yet tender to touch; Neuralgic pains in back, hips and thighs.	Epidymitis (Orchitis, or Swelled Testicles).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Pain in Body— (Abdominal region) Itching and pain in anus.	155 See Anus, No. 9.	Piles.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Pain in Body— (Abdominal region) Affecting liver.	156 Feeling of fullness; dyspepsia; flatulence; emaciation; swelling of abdomen; feet swollen in morning; dark-colored urine; clayey stools; bleeding piles.	Cirrhosis (Gin-drinker's Liver).	
Pain in Body— (Abdominal region) Affecting loins and bladder.	157 See Abdomen, No. 4.	Gravel or Stone in the Bladder (Calculus).	
Pain in Body— (Abdominal region) Affecting region of the liver.	158 Sudden and intense pains in region of the liver, shooting over the abdomen; abdominal muscles tense and tender to pressure; commonly nausea and vomiting; constipation; generally jaundiced appearance; pain ceases suddenly on passage of stone through the gall duct.	Liver, or Hepatic Colic or (Gall Stones).	
Pain in Body— (Abdominal region) With fruitless straining at urination.	159 See Abdomen, No. 2.	Inflammation of the Bladder (Cystitis).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Pain in Body— (Abdominal region) Affecting kidneys and felt in different parts.	160 See: Back, No. 15 (Inflammation of Kidneys). Back, No. 17 (Stone in Kidney). Back, No. 18 (Floating or Movable Kidney).	Kidney Complaints.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Pain in Body— (Region of Stomach)	161 See Stomach, Nos. 206, 207, 208, 209, 210.	Stomach Troubles.	
Pain in Bones—	162 Pain in bones of any part of body, usually worse at night; gradual swelling of the affected part; tenderness on pressure; skin over the inflamed area becomes red. See article on Diseases of Bone as per general index.	Diseases of the Bones.	
Pain in Chest—	163 See Chest, Nos. 29, 30, 33, 34, 35, 36, 38, 41, 42, 43.	Heart and Lung Troubles.	
Pain in Face—	164 See Face, Nos. 72 and 73.		
Pains in Head—	165 Headache may be due to some local disturbance, such as might be caused by overeating, or it may be one of the symptoms of many different diseases.		
Pain in Joints—	166 See Joints and Muscles, Nos. 108, 109, 111, 112.		

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Pain in Fingers—	167 Swelling and intense pain at end of a finger, accompanied by great heat at the location, becoming very sore; festering, even to the bone.	Felon (Whitlow).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Pain in Hip or Knee—	168 Usually the chief premonitary symptom is pain in the knee, generally with a small red spot on the knee-cap; more or less pain and inability to use the limb; after rest of a day or two symptoms disappear and little is thought of the matter until reoccurence some weeks later; pain increased on moving the limb, by rotating it, or by turning the foot outward. The position in which the leg is kept by the patient is peculiar; in the early stages of the disease there is a tendency to support the weight on the toes, the knee being bent and turned out. As the disease advances the affected side is higher than the undiseased side.	Hip Disease.	
Pain in Limbs—	169 See Joints and Muscles, Nos. 108, 109, 111, 112.		
Skin— Malignant pimple.	170 When a malignant pimple or small growth appears on the face, hand or other part of the body, the possibility of its being cancerous should be considered and the family physician consulted. See article on cancer in the chapter on constitutional diseases.	Cancer.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Skin— Malignant Pustule.	171 Red spot, something like a mosquito bite appears on exposed surfaces, such as arms, face or hands, which is soon followed by a spreading hardness of the surrounding tissues, which mortify and turn black; secondary vesicles appear, neighboring lymphatic glands become inflamed, breath grows fetid and there is thirst, high temperature and frequent pulse; general symptoms of severe blood poisoning.	Anthrax or Malignant Pustule.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Skin— Redness, swelling and tension of.	172 Feverish condition; swelling and tension of skin, rapidly increasing; inflammatory redness; may first appear at different parts but commonly is first noticed over the bridge of the nose and on the cheeks; inflammation quickly spreads; tenderness and burning pain in affected part; chill and high fever; inflamed area has distinct margin separating it from the heathy skin.	Erysipelas.	
Skin— Slight redness with itching.	173 Appears suddenly and is characterized by formation of "Wheals" or rounded patches of elevated skin, whiter than the surrounding parts, which are slightly reddened at the margins; may occur on any or all parts of the body, but is usually rather general over the whole body; itching is a prominent feature; usually occurs only in hot weather. Infants and fat people are especially liable and are commonly affected behind the joints.	Hives, Nettle Rash (Urticaria).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Skin— Raw, red patches of.	174 Catarrhal inflammation of the skin, presenting at first irritable, raw, red patches, with occasional little blisters which soon break, discharging a fluid which in drying forms crusts or scabs, which become dry, scaly, and often cracked; intense itching which is aggravated by scratching; may appear on wrists, backs of hands or any part of the body, but is especially apt to appear about the flexures of the joints, such as the hollows of the elbows and knees.	Eczema.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Skin— Pimples; blackheads.	175 Small pimples or whelks, generally appearing on the face, but sometimes on the stomach and other parts and frequently also on the shoulders. The spots or pimples are slightly raised, cause little pain, and usually, but not always, have black heads or yellow points of pus, that is, containing pus; commonly occuring during the years of acquisition of puberty and continuing sometimes for a few years later; seldom appearing before 14 or after 25; more commonly male than female affliction.	Acne.	
Skin— Serious eruptions without itching.	176 When there is serious eruption without itching, it may be indicative of syphilis. Consult articles on syphilis as per general index.	Syphilis and Syphilitic Eruptions.	
Skin— Thickness and redness of nose.	177 Skin covering of nose red; thickening of the skin; generally pimples.	Acne Rosacea.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Skin— Blisters in groups.	178 Eruption appearing on any part of the body in form of little blisters which come out in small groups, and which when appearing about the mouth and nose, constitute the cold sores with which almost everyone is familiar.	Shingles (Herpes)	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Skin— Large blisters.	179 Blisters from one-half to two inches in diameter, resting on slightly reddened surfaces and usually attended with severe itching. These blisters sometimes appear on the fingers, but commonly attack the lower limbs. They generally indicate an impoverished state of the system.	Pemphigus,	
Skin— Pustular eruptions.	180 Separate pustules somewhat like those of smallpox. They may attack any part of the body, but are most apt to appear upon the face and limbs.	Impetigo.	
Skin— Boils.	181 Boils begin with pain and itching, the skin being tight; a hard point forms, at first only perceptible to the touch, but grows larger until it reaches the size of a pea, a cherry, or even as large as a hickory nut, the skin being red and tense. One boil is generally followed by a number of others.	Boils.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Skin— Carbuncle.	182 Carbuncles differ from boils in the larger area inflamed; a core of dead connective tissue, called a "slough," several inches in diameter may come away. They are apt to come on the nape of the neck and the back, but may appear on any part of the body. A large carbuncle may keep a patient in bed for a month or six weeks. The pain and exhausting discharge are very wearing on the strength and may cause death.	Carbuncles.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Skin— Pimples on children.	183 Eruption of innumerable small reddish pimples occuring chiefly on the face, neck and arms; irritation and general disturbance is slight. Eruption is usually due to digestive derangement, such as may be caused by the cutting of a tooth and passes away with cessation of the cause.	Red Gum or Tooth-rash. (Strophulus).	
Skin— Prickly heat, with pimples.	184 Reddish pimples or small granules, appearing on the body and limbs during hot weather and which subside on the approach of the cooler season; occasionally cases take on a severe form and may become chronic.	Prickly Heat (Lichen).	
Skin— Pale, elevated pimples.	185 Eruption of pale, slightly elevated pimples, generally on the trunk of the body; intense irritation, especially at night, causing the patient to scratch to such an extent that marks of the nails can almost always be seen, and aid in recognizing the malady. It is frequently the result of the presence of vermin.	Prurigo.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Skin— Scaly eruption.	186 Oval or rounded patches of slight irritation followed by an eruption of scales, which grow dense and white toward the center. Afterward the spot expands from its outer edge, the skin generally being reddened and slightly raised above the level of the surrounding surface. The whole body may be covered with these white scales, excepting the face, the palms of the hands and the soles of the feet and even these are sometimes subject. After some time the skin chaps and breaks; severe soreness with exudation of fluid, intense irritation and itching, with great physical exhaustion, lasting for many weeks, or perhaps months. Is prone to reoccur in a patient who has once suffered. It is often hereditary. It is not contagious.	Tetter (Psoriasis).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Skin— Scaly scalp.	187 In mild form it gives rise to the shedding of an immense number of bran-like scales, resembling an exuberant crop of dandruff. A rare variety affects the whole body, generally proving fatal.	Pityriasis.	
Skin— Itching, without eruption.	188 General itching without any eruption or other apparent change in the appearance of the part affected. Children and elderly people are particularly apt to suffer and the localities involved are generally those about the orifices of the body.	Pruritis.	
Skin— Yellow.	189 See Nos. 21, 28, 63, 124, 148, 152, 156, 158, 189, 221.	Jaundice, Liver Complaint, etc.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Skin— Yellowish scales on infants.	190 Excessive secretion of oily matter accumulating upon the surface of the body in the form of thin, yellowish scales.	Seborrhea.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Skin— Fungous growth.	191 Development of fungus not only invading the skin, but affecting also the hair and hair follicles. The fungus consists of microscopic threads corresponding to the stem of a grape-vine and microscopic seeds in bunches like grapes, called spores. This is a vegetable parasite growth and is contagious.	Fungous or Vegetable Parasitic Growth.	
Skin— Head ringworm.	192 Commences usually as a little pimple, soon spreading and taking on a ring-like appearance, showing a circle of minute scales, pimples and vesicles at the circumference of the patch; hairs included in circle become dull, dry, twisted and easily broken off, the stumps of the hairs becoming covered with a grayish white powder; as patch becomes dry and scaly the hairs die and drop out at the center, so that ultimately a bald spot of from one-half inch to two inches in diameter is left. The disease is of a vegetable parasitic or fungous order.	Ringworm of the Head (Tinea Tonsurans).	
Skin— Body ringworm.	193 Symptoms are the same as Ringworm of the Head, starting with a small pimple spreading with great rapidity and the rings of eruption may attain a diameter of four or five inches. The characteristic of the affection is	Ringworm of the Body (Tinea Circinati, or Herpes Circinatus).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	its healing up in the middle, presenting after a time a patch of healthy or slightly reddened skin, surrounded by an angry red ring about a quarter of an inch wide.		
Skin— Barber's Itch.	194 A fungous parasitic vegetable growth of the nature of ringworm forming on the face of an adult male. Much irritation from the roots of the hairs of the beard, extending deeply into the skin and growing down along the sides of the hair follicles; large papules and even pustules; itching and burning.	(Tinea Sycosis).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Skin— Scald Head.	195 Of ringworm character, peculiar dry, sulphur-yellow crusts, in form of little cups about a quarter of an inch in diameter, these cups, as the disease advances, so running together that they are only recognizable at the edge of a patch; peculiar mouse-like odor emitted from head. Disease frequently occurs with neglected, ill-nourished children.	Scald Head (Tinea Favoso or Favus).	
Skin— Itch.	196 Intense itching, generally much worse at night, after becoming warm in bed. The parts most commonly affected are the hollows of the elbows and knees, the fronts of the wrists, and the backs of the hands just between the roots of the fingers, but other parts of the body are subject, especially where the skin is tender, and the palms of the hands and the soles of the feet are sometimes affected, notwithstanding the thickness of the skin in these	Itch. (Scabies).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	parts. Eruption quickly occurs, varying in character, in some cases being best to find upon the forearms and lower part of abdomen and inner portion of the thighs, while in others it is more frequent about the fingers and breasts. The disease is caused by the Itch mite, spreads rapidly and may cause serious, permanent skin trouble if not eradicated. It is very contagious.		
Skin— Lice Itch.	197 There are three varieties of lice, one infesting the head, another the body, and the third the pubes of man. They cause intense itching until eradicated.	Lice Itch.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Skin— Blueness of.	198 Blueness of skin at birth, occasionally but not often making appearance several weeks or even months later; shade of blueness varies in different cases; color becomes deeper on exertion; blueness most noticeable on cheeks, lips, tongue and extremities; feeble circulation; cold skin.	Blue Disease (Cyanosis).	
Skin— Unhealthy whiteness of.	199 Face, hands and general surface pallid and slightly waxen; dizziness; faintness; palpitation; cold hands and feet; weak and feeble pulse; impaired action of organs generally, especially stomach and bowels.	Anæmia.	
Skin— Putrefaction of.	200 Mortification or death of a part of the living body; moist, pale, shrivelled, bluish mottled specks; dark, livid and swollen skin; foul odor.	Mortification or Gangrene.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Skin— Sore with discharge.	201 Open sores which discharge a yellowish-white fluid, which is foul smelling.	Ulcer.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Skin— Kernels under.	202 Kernels under the skin which thicken, inflame and discharge a thick red secretion; skin is usually delicate and irritable; eyelids are apt to be red and swollen; eyes very liable to inflammation; hemorrhages from the nose, cold in head, enlarged tonsils are frequent; muscles lack firmness; swelling of the lymphatic glands, more particularly about the neck; after a time suppuration occurs, the swellings become softer and skin over them assumes a dusky red hue, finally bursting and giving outlet to pus mixed with curd-like deposits.	Scrofula.	
Skin— Purple spots on body.	203 Langour, weariness on very slight exertion, faintness, gnawing pains in stomach; variable appetite, generally poor but sometimes inordinate; tongue yellowish and coated; countenance sallow and dingy, or face may have pale, bloated appearance with swelling beneath eyelids; purple spots on legs and afterwards without any regular order on the thighs, arms and trunk of the body, their formation being attended with great weakness and depression of spirits; deep-seated pains in stomach region, also in chest and loins. Sallow or waxy-colored and dingy complexion, dropsical swellings of the feet and legs, with gangrenous sores are dangerous symptoms.	Land Scurvy (Purpura).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	204 Langour, debility and lowness of spirits first occur, then swelling; sponginess and bleeding of gums, loosening of teeth and offensive breath,—palpitation of the heart and difficulty in breathing sometimes present; spots on limbs; diarrhœa and dysentery commonly occur; all parts of the body extremely sensitive to pressure; slightest possible blow may produce extensive bruise; small eruptions like flea bites are often to be seen on the legs and about the same time the muscles of legs and thighs become hard and painful, the skin grows yellow and then purple and thus appears in spots over the body, the spots at the commencement being frequently as large as the palm of the hand, and afterward usually extend until they cover a large area.		
Skin— Flea bite-like eruptions		Scurvy (Scorbutus).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
	205 Symptoms of Anæmia developing into acute dropsy; coldness of hands and feet; palpitation of the heart; difficult respiration after the slightest exercise; rapid pulse; marked pallidity of face; debility in action of the kidneys; tongue of a semi-bloodless appearance. The progress of the disease is very slow and insidious; in the later stages langour, swelling of the extremities with partial loss of muscular power and finally complete loss; dropsical swelling of feet and legs gradually extends upward until the whole body seems to be bloated with water; urine is passed in very small quantities of light color; constipation; nausea; hot and dry skin.		
Skin— Dropsical condition.		Beri-Beri.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Stomach— Acute distress in.	206 Severe pains over pit of stomach shooting through to the back, increased by taking food and temporarily relieved by vomiting; vomited matter consists of the glairy mucus, stained with bile of a greenish-yellow or bright green color; coated tongue, the edges and tip frequently being red and irritated; bowels usually confined; scanty and high-colored urine. Symptoms often commence with chilliness followed by hot skin, weak, rapid pulse, difficult breathing and obstinate hiccough. In severe cases there may be great prostration.	Acute Indigestion or Inflammation of the Stomach. (Acute Gastritis).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Stomach— Dyspeptic.	207 The symptoms of Dyspepsia are so many and so varied, including as they do, heartburn, pyrosis, waterbrash, distension of stomach, etc., that to gain any adequate idea the full article on Dyspepsia must be read. See general index at back of book.	Dyspepsia.	
Stomach— Gnawing pain after eating.	208 Pain and tenderness over pit of stomach, shortly after eating and increasing until relieved by vomiting; sometimes distress extends through to the back; seat of tenderness coincides with that of pain and is localized over comparatively small surface. Vomiting of blood occurs in about one-third of cases and is usually profuse; it may be in black clots or fresh blood, also blood is frequently passed by the bowels. The pain is often described by	Ulcer of the Stomach.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	patients as of a gnawing character and is generally made worse by condiments, animal food, saccharine substances and alcohol. Usually occurs in early rather than advanced life.		
Stomach— Cancerous.	209 Ordinary symptoms of Gastritis or mere Dyspepsia followed in a few weeks or months as a rule by the vomiting of small quantities of blood so mixed with gastric juice as to present a brown color, which with the minute clots have caused the expressive name of "coffee-ground vomit,"—not an infallible sign, but constituting one of the surest early evidences of cancer of the stomach. The disease resembles ulcer of the stomach, but is distinguished by the fact that it occurs in advanced life instead of youth, by the character of the blood vomit, by greater diffusion of the tenderness, by constancy of the pain, by the anæmic state and by the increasing tumor which generally can be felt through the thin walls of the abdomen.	Cancer of the Stomach.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Stomach— Neuralgia in.	210 This is a purely nervous affection, its only symptom being intense pain in the region of the stomach, shooting outward in different directions. The pain may be so great that the patient will roll upon the floor and writhe in agony. There is no tenderness over the stomach and pressure sometimes relieves pain to a certain extent.	Neuralgia of the Stomach. (Gastralgia).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Swelling— Of the feet and ankles.	211 Soft, inelastic swelling of feet and ankles; pressure of the finger upon swollen part creates an indentation which remains for a minute or so before it is filled up by return of watery fluid; the reproductive organs often become enormously swollen and the disease soon reaches the abdomen; distress in breathing as disease progresses; scanty urine; palpitation of the heart; deficient perspiration; mental distress; thirst; constipation; daily increasing weakness.	Dropsy.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Swelling— Of the veins.	212 Hard, swollen, knotted veins of dark blue or purple color, the legs and thighs being most commonly affected.	Varicose Veins (Phlebitis) Inflammation of the Veins.	
Swelling—	213 Swelling is also an accompaniment of sprains, bruises and many minor troubles, and if occurring apart from the foregoing general symptoms, some other prominent symptom, occuring in connection with the swelling must be looked for.		
Throat— Inflamed.	214 Chill, followed by rise of temperature; pains in back and limbs; redness and dryness of throat with painful swallowing; tonsils may be felt as hard lumps behind the angle of the jaw; if only one tonsil swollen, the uvula is drawn to the affected side; usually white patches cover the tonsils,	Tonsilitis or Inflammation of the Tonsils.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	which must not be confused with diphtheria, in which the white coating is continuous over the tonsils and extends up upon the fauces and uvula and is grayish-white in color, tonsilitis on the contrary being in patches of white or whitish color.		
Throat— Abscesses in.	215 Abcess or boil forms in the substance of the tonsils attended with great pain and swelling, difficulty of swallowing and some loss of strength; sometimes earache; breathing much interfered with; abcess may break on fifth day or linger until tenth day, after which recovery is usually rapid.	Quinsy or Abscess of Tonsil.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Throat— Membranous, whitish-gray coating of.	216 Symptoms of slight cold, feeling of fullness and irritation within the throat; moderate fever, chilliness and general lassitude; pain in back; although sometimes delayed a day or two, small whitish-gray spots appear on one or both tonsils which spread more or less rapidly, often involving the pharynx and nose and extending downward to the larynx. Color soon becomes dirty gray or yellowish, if membrane be removed new membrane quickly takes its place. Great prostration.	Diphtheria.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Throat— Whispering voice.	217 Slight catarrh quickly followed by high fever; hoarseness of voice which soon becomes whispering; cough at first clear and shrill, then harsh and croupy, is also reduced to little more than a whisper, and a peculiar noise like a loud whisper accompanies both inspiration and expiration, which, from almost the beginning, are laborious and wheezing. Dropsical swelling soon comes on, narrowing the opening of the glottis, making it painful and difficult to breathe, and causing an expression of great anxiety on the patient's face.	Inflammation of the Larynx. (Laryngitis).	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Throat— Difficulty in breathing.	218 Growth at the back part of the nose passages; difficult breathing with inclination to breathe through the mouth; snoring when asleep; chiefly prevalent in children.	Adenoids.	
Throat— Stricture of.	219 Spasmodic stricture of the gullet caused by simple contraction of its muscular fibres, —common in hysterical females; similar condition produced by the swallowing of scalding water or some corrosive substance, usually followed by ulceration. A cancerous growth in the gullet may produce same symptoms.	Diseases of the Aesophagus or Gullet.	
Urine— Frequent urination with burning at abdomen.	220 Frequent desire to urinate; burning pain at bottom of abdomen; nausea and vomiting.	Inflammation of Bladder.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Urine— High-colored; pain in right side.	221 Scanty, highly-colored urine; nausea; furred tongue; yellow skin and eyes; cough; pain in right side and shoulder.	Liver Complaint.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Urine— Yellow, with yellow skin.	222 Peculiarly yellow urine, staining linen; yellow tinge to skin and whites of eyes.	Jaundice.	
Urine— Frequent passage with scalding sensation.	223 Deep red urine; frequent desire to pass; scalding sensation; constipation; pain in lower part of back.	Kidney Disease.	
Urine— Albuminous.	224 High-colored urine containing albumen causing a cloudy appearance; dropsy; headache; puffiness of eyelids; fever.	Bright's Disease.	
Urine— Excessive urination.	225 Pale urine passed in excessive quantities; great thirst; marked loss of weight and strength; anæmia; sweetish breath.	Diabetes.	
Urine— Inability to retain.	226 Frequent desire to urinate and inability to retain it after inclination comes, resulting oftentimes in wetting the bed.	Incontinence of Urine. (Eneuriasis).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Urine— Painful suppression of.	227 Constant desire to urinate; force of stream diminishes so that secretion dribbles or runs off in a very fine stream, not larger than a knitting needle or may spread or twist in corkscrew shape; more or less pain in urinating and considerable straining requisite to accomplish operation, which begins to be dreaded from day to day and even from hour to hour.	Stricture of the Urethra.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Vomiting—	228 Vomiting occurs in respect of so many slight ailments and is an accompaniment of so many different diseases that it becomes necessary to diagnose from other symptoms, not losing sight of the fact, however, that nausea is present.		
Vulva— Itching of.	229 Intense itching causing such scratching that the parts bleed; itching usually aggravated by walking or becoming warm in bed; intense suffering causes loss of sleep, exhaustion, nervous depression and sometimes melancholia.	Itching of the Vulva. (Pruritis).	
Vulva— Bleeding of.	230 Symptoms are practically those of injury to any other part of the body; bleeding may be profuse, especially if there is a cut; pain of a sharp or tearing nature; sometimes faintness; swelling which, if large, may cause difficulty in passing water.	Bleeding of the Vulva. (Hematoma).	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Vagina— Contraction of.	231 Painful, spasmodic contraction of the vagina which more or less prevents intercourse. May be due to sensitive remnant of hymen, fissure of the vagina, erosion of the parts, fissures of the anus or an urethral carbuncle.	Contraction of Vagina. (Vaginismus)	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Vagina— Discharge from.	232 Thick, whitish and gelatinous, or thin and milky discharge.	Leucorrhea. (The Whites).	
Vagina— Severe pain during urination.	233 Small raspberry-like growth at the mouth of the urethra giving rise to severe itching and pain; during urination, the water running over the growth, the pain is so excruciating that women oftentimes will withhold from passing water until they can no longer withstand the call of nature.	Urethral Carbuncle.	
Vagina— Itching and burning of.	234 Feeling of heat in the vagina; pain in the pelvis; itching and burning of the part; backache; usually frequent desire to urinate; loss of appetite and at times nausea.	Vaginitis.	
Vagina— Hemorrhage of.	235 Hemorrhage of the vagina following either straining at stool or coition; a foul discharge which is very repulsive; discharge may be thick, but as a rule is watery; pain is not marked at beginning, but becomes so as the disease develops.	Malignant Tumor of the Vagina.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Vagina— Laceration of.	236 Lacerations of the walls of the vagina during childbirth cause a disturbed condition of the bladder which results in more or less trouble in voiding urine and an inability to completely empty the bladder each time, resulting commonly in an inflammation of the bladder.	Laceration of the Perineum.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Womb— Weight in Pelvis.	237 Sensation of weight in the pelvis and slight pain; profuse, thin and watery discharge which later becomes thick and tenacious, like the white of an egg; menstruation may or may not be painful.	Inflammation of Lining Membrane of Womb (Endometritis).	
Womb— Pain on left side of abdomen.	238 Chill, generally followed by fever; pain more or less marked and may extend down in the legs, and is generally especially troublesome on the left side of the abdomen over the ovary. Menstruation is apt to be accompanied by great pain.	Inflammation of Walls of Womb. (Metritis).	
Womb— Severe pain and hemorrhages.	239 Severe pain and hemorrhages; pain especially severe during menstrual period; hemorrhages may occur several times between monthly periods, or monthly period itself may last for a week to ten days.	Fibrous Tumors of the Womb.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
Womb— Profuse menstruation.	240 Profuse menstruation and as disease progresses, frequent discharges of blood between the periods, often amounting to attacks of flooding; leucorrheal discharge which may be tinged with blood; occasional paroxysms of pain.	Polypus Tumor of the Womb.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
Womb— Inflammation at neck of.	241 Inflammations and ulcerations of the womb mix and run into each other, resulting in raw places, forming granulations or pimply surfaces and hardened spots; sometimes the pimply patches become red and hard, the whole surface spongy; pus flows freely at times and at others scantily, may be thick and yellow or thin and lighter color; sensation of heat and smarting; sometimes severe pain in right side of abdomen and back part of head; menstruation varying in character, sometimes profuse and painful, at others scanty.	Ulceration of the Womb.	
Womb— Cancerous.	242 In very early stages there are no unusual symptoms, but as the disease progresses, the following will appear: 1. Hemorrhages; 2. Uterine discharges; 3. Pain; 4. Visceral disorders; 5. Cachexia.	Cancer of the Womb.	
Womb— Leucorrhea and irritated bladder.	243 Dysmenorrhea; leucorrhea; irritation of bladder, causing frequent urination, and more or less constant distress in the lower part of the abdomen; sterility frequently exists.	Forward Displacement of the Womb.	

Most Noticeable Symptoms	Accompanying and Following Symptoms	Disease Indicated	
	244		
Womb— Backache and dragging pains in abdomen.	Painful menstruation the first day or two of the flow; frequent miscarriages; leucorrhea; constant, dull, aching pain in the small of the back; dragging pains in the lower part of the abdomen and thighs; headache; constipation; bowel movements at times painful; bladder may be irritable, and at times the urine may escape when the woman laughs heartily.	Backward Displacement of the Womb.	For the main article on the subject consult the general index. See chapter index, page 1257, for simple home remedies. Prescriptions and formulas for home preparation will be found at page 1231. For treatment by various schools of medicine see page 1491.
	245		
Womb— Backache and sensation of weight about the pelvis.	Sensation of fullness and weight about the pelvis; wearisome backache; leucorrhea; obstinate constipation; as disease advances frequent desire to urinate and inability to completely empty each time, resulting in an inflammation of the mucous membrane.	Falling (Prolapsus) of the Womb.	

TABLE OF INFECTIOUS AND CONTAGIOUS DISEASES

Disease	Period of Incubation	Symptoms Appear After Infection	Disease Disappears	Infection Ceases
Chicken-pox.	10 to 16 days.	1st day and 3 following days.	About 4th day.	When every scab has fallen off.
Cholera, Asiatic.	1 to 7 days.	1st to 3d day.	1st to 4th day.	When disease disappears.
Diphtheria.	2 to 10 days.	1st to 3d day.	From 12th to 16th day.	In four weeks, if no discharges or albumen, and if bacteriological examination of nose and throat be negative.
Erysipelas.	2 to 8 days.	1st or 2d day.	3d to 14th day or longer.	In not less than 7 days and ranging to 14 days.
Influenza.	1 to 6 days.	1st day.	2d to 21st day.	When disease disappears.
Measles.	10 to 14 days.	4th day; highly infectious for 2 days before rash appears.	9th or 10th day.	In not less than 2 weeks from appearance of rash.
Measles, (German).	7 to 18 days or longer.	2d to 4th day.	4th to 7th day.	In not less than 10 days from appearance of rash.
Mumps.	10 to 22 days.		5th to 7th day.	In not less than 3 weeks, and only when 1 week has elapsed since subsidence of all swelling.
Ringworm.				When examination reveals no broken off, diseased hairs.
Scarlet Fever.	1 to 8 days, usually 3 to 5.	5th day.	5th day.	When scaling skin, sore throat and albuminous condition of the urine disappear, but never in less than 6 weeks.
Small-pox.	12 to 14 days.	3d or 4th day.	14th day.	When every scab has disappeared.
Typhoid Fever.	7 to 21 days, usually 10 to 14.	8th or 9th day.	21st day.	When disease disappears.
Typhus Fever.	5 to 14 days; very variable.	5th day.		After 4 weeks.
Whooping Cough.	7 to 14 days.	The whooping may not appear for 3 weeks, although infectious before then.		In 5 weeks from commencement, provided all spasmodic cough and whooping have ceased for at least 2 weeks.
Yellow Fever.	1 day.	1st to 2d day.	1st to 4th day.	When disease disappears. (Yellow Fever is indirectly contagious, the germ being transmitted by the Yellow Fever mosquito.)

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Book VII

THE SICK ROOM IN THE HOME

PART I.

NURSING

General Consideration.—There is no room to doubt that faithful, intelligent and efficient care of the sick is often responsible in large measure for recovery from attacks of severe illness and that the ministrations of a well-qualified nurse are second only in importance to skillful medical attendance. In fact there are diseases in which good nursing is more essential to the welfare of the patient than medicines, and in which these would be of little avail, unless accompanied by conscientious services of this character. At best the physician can spend but a few moments each day in a single sick room, and the remaining hours must be given over to the care and superintendence of some other person.

The employment of a trained nurse is expensive. Moreover, it is not always easy to secure one that is satisfactory,—for many so-called "trained" nurses are incompetent. Not only this, but even when she is competent there is apt to be a certain mechanism about her work which comes from a lack of that personal regard for the patient which can only be bestowed where ties of blood or dearest friendship exist.

No one can or will care for the ill so well as the mother, if she be competent. But she is not competent if she has not the scientific knowledge of what is best to do in respect of each and every circumstance as it may arise. Every mother should have knowledge of the science of nursing if she would have her husband and her children receive the best care, for even where a nurse is employed it is of inestimable value that the mother should know whether the nurse is in every way doing her duty. Where there is a grown daughter in the family she, too, should be thoroughly informed in nursing that she may take the mother's place,

or in case of need be the mother's nurse. If accompanied by proper knowledge the care by loved ones brings a rest and comfort to the ill which cannot be brought about by the mere stranger who does her work for hire, no matter how competent she may be. But, without proper knowledge, with all the mother's love, sins of both omission and commission are sure to occur and there is danger of sympathy overriding judgment. Specific knowledge of the exact requirements in respect of each and every incident as it may occur is essential, and it is the purpose of this chapter not only to supply such knowledge but to present it in such shape as to make it a ready reference to which the mother may quickly turn in all matters that come within the scope of nursing. And, it is to be borne in mind that a competent nurse is the doctor's greatest friend, for the physician can treat his case with greater certainty and success if his aide-de-camp, the nurse, be efficient.

The Nurse is Doctor's Assistant.—The nurse is the physician's assistant, and he often depends, in forming his estimate of the condition and needs of his patient, largely upon the observation and judgment of the one who is in constant attendance on the case, who sees the changes which occur at different times of day or night, who notes the effect of this remedy or of that food, and who makes to him reports based upon what transpires during his absence.

What the Doctor Gains.—Thus he often gains valuable suggestions regarding the course and management of the case from what to the inexperienced and untrained might be considered a trivial symptom or a circumstance not worth repeating.

It is not the office of the nurse to discriminate between the important and unimportant features of a case, but to endeavor to give the medical attendant a faithful picture of the case as she has seen it, leaving it for him to weigh the evidence given, to form a just estimate of its value. On his departure the responsibility of the execution of his orders devolves upon her, and until his return it is she who assumes the control of the case and gives directions.

Technical Details.—These embrace information on such matters as the care of the patient, including moving, lifting, bathing, dressing, and attending to his wants and comfort; such details as relate particularly to the management of the case, as taking temperature, pulse and respiration, observing symptoms, administering medicines and applying external agents; the preparation and giving of food and drink; the care of the

room, attention to the room, including its general cleanliness, order, disinfection, heat and ventilation; and the care of the bed, etc.

But the true nurse does not confine herself to the mere mechanical carrying out of such details,—she brings to bear her best thought and all the kindliness of her nature in endeavor to make the ill one happy and content in spite of suffering, and yet with a firmness that brooks not of over sympathy when this might interfere with duty. A brief consideration will here be given to some of these essential qualities.

QUALIFICATIONS OF THE NURSE.

Disposition.—Lamentable failure will inevitably attend the efforts of any one attempting to nurse, if she has not a suitable disposition. The qualities which constitute an ideal disposition for a nurse unfortunately are rarely all found in any one person. It will nevertheless be useful to consider some of the most important of them.

1. **Amiability.**—Essentially the product of a benevolent nature, this is a trait of prime importance. A spontaneous flow of kind acts and considerate attentions should characterize the nurse; whereas, irritability of temper and thoughtless and inconsiderate acts are so inexcusable as to at once disqualify her for her work. Therefore, she must naturally be *kind* in thought, word and deed.

2. **Sympathy.**—Sympathy with a patient's distress, without weak sentimentality is an outgrowth of this attitude of mind, which is of value to the nurse and of benefit to the patient, if not too freely exercised.

3. **Cheerfulness.**—A bright and sunny disposition not only brings life, hope and cheer into the sick room, and thus aids in the favorable progress of the case, but sheds its influence through the entire household, lightening the burden of trouble from those who are in distress. The sick room is not the place for a gloomy or morose person.

4. **Unselfishness.**—Disregard for personal comfort and convenience and untiring devotion to the interests of the patient are demanded of the nurse. Hers should be largely a labor of love, in conformity with which, she should be willing to sacrifice herself in behalf of her patient.

5. **Calmness.**—A nurse with an excitable temperament, who is upset by trivial circumstances, and who cannot even in an extremity exhibit composure, will not tend to tranquilize a patient who is already in a state of nervous irritability. Cool judgment, calm demeanor, and, when not accompanied by hesitancy, deliberate action, will tend to inspire confi-

dence in her intelligence and proficiency, a fact of no little importance in serious illness.

6. **Patience.**—The trying circumstances incident to the sick room and the exacting requirements of the patient, often call for the exercise of the most unbounded patience. Those who ordinarily are thoughtful and considerate are frequently, when sick, unreasonable in the extreme, and their demands for attentions, which are often unnecessary, become most exasperating.

7. **Firmness.**—It is desirable for the nurse to be sufficiently resolute to secure compliance with her instructions, but it is not needful to maintain, as is often done, a dogged and uncompromising attitude, and to be immovable to appeal in non-essentials. Arbitrary refusal in such matters creates antagonism on the part of the patient, which more than counterbalances what has been gained by the nurse and which materially lessens her influence and usefulness.

8. **Tact.**—Not only in these matters but in her general deportment in the sick room is there opportunity for the exercise of tact. To divert the patient from an undesirable train of thought without making it apparent; to be discreet about the subject of conversation, neither unbosoming all her family affairs nor detailing the histories of all her previous cases; to avoid either depressing, exciting, tiresome or otherwise objectionable topics when reading is permissible; to regulate the matter of visitors without giving offense; in these and in manifold ways are shown the importance of having good, sound common sense, a quality unfortunately far too rare among those who engage in this art.

9. **Observation.**—The nurse should be a careful observer, able to notice differences in the condition of the patient, and to recognize at least in a measure the meaning of symptoms which she sees. Frequently it is left to her judgment to give more or less of a medicine prescribed, or to change one remedy for another, according to the condition of the patient, and a failure to correctly observe and properly interpret what is seen will work to the detriment of the patient.

10. **Physical Soundness.**—The strain, physical and nervous, caused by untiring vigilance, loss of sleep, irregular meals, confinement to the sick room, and anxiety, are such as to make essential to the nurse an exceptionally sound, healthy body, endued with the power of endurance. In addition there should be good vision, good hearing and good sense of smell, all of these faculties being called into frequent requisition.

THE NURSE AT WORK.

Personal Conduct.—Granted that a nurse has enough qualifications to make her an efficient nurse, there are still some details pertaining to her personal conduct in the sick room, and which are largely under her control, the observance or neglect of which will make the difference, often, between her being acceptable or not to her patients. Some of these are quite essential, while others may appear to be of little consequence, yet to those suffering from severe illness there are no trifles; mole-hills appear as mountains, and the insignificant become matters of great moment, and these very trifles often have much to do with the comfort and peace of mind of the one under the nurse's care.

Reference is had to such matters as dress, personal appearance and habits, movements, manner of speaking, touch, etc.

Clothing.—The outer clothing of the nurse should be of plain, modest color and preferably of wash material, an indispensable requirement in infectious cases. Starched clothing should not be so stiff as to make a constant rustling with every movement. The shoes should be noiseless.

Speech.—The nurse should endeavor to speak distinctly and evenly, though never abruptly nor in loud and rasping tones. Equally objectionable is it to whisper, as this almost invariably is annoying to the patient if he is awake. The voice should be cheerful and reassuring and calculated to inspire with hope and confidence. Very many questions of the patient must be answered adroitly, yet in such a manner as not to convey the impression that attempts are being made to conceal from him what he desires to know.

Touch.—The hands should be always warm, smooth and scrupulously clean and the nails well trimmed. A combination of gentleness and firmness is to be desired in handling and moving the patient, efforts of this sort being steady and deliberate, not sudden and jerking.

Appearance.—General neatness of the hair and person should be strictly regarded. She who is careless of her appearance and tidiness will presumably be equally so of the one under her charge.

Manner.—If nurse is lacking in the ability to make herself acceptable to her patient she is confronted by an insuperable obstacle to success. This will depend almost wholly on her deportment in the sick room. An awkward, boisterous, bustling nurse will not compare favorably with one who quietly and unobtrusively accomplishes her tasks without confusion

and noise. Nor, on the other hand, will the nurse who stealthily creeps around on tip-toe be likely to prove acceptable to her patient.

Study of Disposition.—A studious observance of the patient's disposition and a readily ascertainable knowledge of his likes and dislikes will soon enable the nurse to anticipate his wants, to scrupulously avoid that which is likely to annoy and to secure for him that which will give comfort and pleasure or bring repose of body or mind. It is this considerateness for the wishes and feelings of the patient which so often constitutes the difference between success and failure and the lack of which to a sensitive nature is a constant source of irritation and annoyance.

What a Nurse Should Avoid.—A nurse should not forget that a patient's progress toward recovery is retarded by such practices as the following: To rock incessantly in a squeaky chair; to sit and constantly tap with the foot or fingers; to noisily prepare for bed in the room after the patient is ready to sleep; to so time the administration of food and medicine, where this can be avoided, as to disturb the patient just as he has settled comfortably for a nap; to be continually asking whether he would like something done for him; to make unnecessary noise with dishes or papers; to allow the light to shine uncomfortably in his eyes; to hurry him with his meals; to shake his bed, and so forth.

THE SICK ROOM.

Location.—This is a matter of much importance and may vitally affect the patient's progress. The ideal sick room is one that is large and cheerful, having southern exposure, high ceilings and plenty of windows to admit sunshine and air. There should be a fireplace, more for ventilation and cheeriness than warmth, and the location of the room should be away from annoying noises and smells, such as from kitchen or stable. The furniture should be simple yet pleasing and the curtains of muslin, linen or other washable material. It is seldom that all these conditions may be had, but the more nearly they may be reached the better for the progress of the patient. In cases of contagious disease it is especially desirable to have the room isolated from other rooms.

Ventilation.—It is almost impossible to overestimate the importance of proper ventilation in the sick room. No matter how poorly their living-rooms may be ventilated, people who are well are usually part of the time out of doors and so get at least a certain amount of fresh air. But the patient who lies in an unventilated sick room breathes day and night over and over again an atmosphere poisoned by the breath of himself

and others, by exhalations from his skin and evacuation and perhaps from discharging of wounds. There should be a constant and uniform supply of fresh air and not only must fresh air be let in but the foul air must be let out. Nothing is better for getting out foul air than an open grate fire which causes a constant draught up chimney and carries the foul air up from below while fresh air may be brought in through open windows. But it is seldom that a sick room has the advantage of a fireplace and the next best thing is to open at the bottom a window farthest from the patient and lower the other windows of the room from the top, thus creating the necessary draught to drive out the foul air and replace it with fresh. If the air blows uncomfortably on the patient a screen can be arranged. Not only is pure air necessary but all sources of contamination must be cut off. If there is set bowl or anything else communicating with sewer all exit holes must be closed and everything possible done to keep the air of the room continuously pure and wholesome.

Temperature of Room.—The sick room should be kept at low rather than high temperature, especially in fever cases. Pneumonia is successfully treated even in the open air both day and night. The patient is protected from the cold by fever and bedclothes, but the attendants may find it necessary to wear heavy outer garments to keep warm. It is well to remember, however, that cold is greatest and the body least able to resist it at about three or four o'clock in the morning, and at these hours the covering of the patient should be given careful attention. Also at times of washing or dressing the patient, changing sheets, etc., the room should be comfortably warm. About 70° F. or a little over is a good temperature at such times.

Cleanliness.—Dirt in the sick room breeds disease. With cleanliness and proper care even the most virulent of contagious and infectious diseases may be confined to a single member of a household. Carelessness in respect of even the smallest detail, such as permitting a single article of soiled linen to stand without being disinfected, or allowing flies to enter and leave the room, may result not only in giving the disease to others of the household, but perhaps in spreading it throughout the entire neighborhood and in creating an epidemic.

The nurse should bathe frequently. Her own health demands it and not only so, but the patient is highly sensitive to and affected by the cleanliness or otherwise of the attendant. This cleanness should extend not only to the body, but the clothes as well. The "Sairey Gamp" of Charles Dickens' fame has passed, we hope, forever from the sick room.

The nurse should be dressed plainly in some wash material, the hair kept combed and in control and the hands and nails must be kept immaculately clean. An untidy, unkempt nurse has a reactionary and ill effect on the patient, while cleanly sweetness acts as a tonic.

The patient should be frequently bathed. The pores of the skin must be kept open and clean. The patient may object, but the patient must not be permitted to be the judge. Every morning, every noon and every evening the face and hands at least must be carefully sponged, the mouth and teeth carefully cleaned and the hair brushed, and this must be faithfully attended to even when the patient is unconscious. The effect is marvelous in refreshing and cheering the patient. Alcohol sponge bathing of the body is especially recommended in cases of fever.

In fever patients the care of the teeth, the tongue and the roof of the mouth is imperative. Without frequent and proper care they will become filled with sores and there will be hardening and cracking, the breath will become foul and the patient will needlessly suffer. The patient should rinse the mouth frequently with a boracic acid solution or a mild salt solution, and when the patient is too weak to do this the nurse should wash the patients' mouth frequently and carefully—always after eating. Do not use soda, as it dries the membrane and causes the tongue and lips to crack. In washing the mouth use antiseptic gauze or fine aseptic muslin, which can be done with a piece of gauze over the index finger or by winding the end of a stick with absorbent cotton or gauze. As preventive of cracking, oil the patient's lips with cold cream, cocoa butter or some similar non-irritating salve.

In all fever cases the nostrils of the patient should be carefully watched as excretions become hardened and soon obstruct the nasal passages. Hardening excretions should be gently removed and the nostrils from time to time gently bathed with olive oil, cold cream or the like, to prevent the formation of sores. Thoughtful, attentive watching in these little things is one of the great perquisites of the trained nurse and must be followed by the non-professional nurse if she would successfully attend her patient.

Dust in the sick room is dangerous. Keep everything clear of it by going over it frequently with a cloth well wrung out in a weak carbolic solution or other disinfectant. This should be done at least twice a day and its faithful observance will do much in preventing disease germs floating through the house.

All towels, linen, bedclothes, etc., used in the sick room should be

dipped in a carbolic or other antiseptic solution. A properly prepared carbolic solution has an advantage in that it does not stain or otherwise injure the linen, yet is an excellent germicide. After being wrung out in the solution they should be put in a boiler and boiled for an hour. Under no circumstances should they be allowed to stand without thorough disinfection.

The infection of typhoid fever is through the urine and stools, and the smallest indiscretion on the part of the nurse may result in the spread of the disease not only through the household, but possibly throughout the whole neighborhood. Watch the bed linens carefully and allow no spots to remain after the bedpan or urinal has been used. Small stains may be disinfected with a solution of bichloride without removing the sheets, but if large the sheets should be removed. Always bathe the hands of the patient after any action of either the bowels or kidneys. Typhoid germs come only in the discharge of typhoid patients, chiefly the stools and urine, and to give the disease to someone else they must be swallowed by such other person. Revolting as this may seem, it is the simple truth, and the only way in which typhoid may be conveyed from one person to another. These germs usually get into food and drink through careless personal habits of attendants upon the patient or of the patient himself when he has become convalescent or even apparently well. The amount of minute particles from body discharges need not be enough to be detected by our senses in order to pollute milk, drinking water or food whether cooked or to be eaten raw. Milk cans which have been washed in polluted water can spread typhoid through the milk put into them. The prevention of spread of typhoid is simply a matter of care that germ-laden discharges from the patient—the stools and urine—are so disposed of that not even the minutest particle can find its way through food or drink to the mouths of other persons. Those who have the care of typhoid patients, and the patients themselves as they grow better, must observe cleanliness of the most perfect kind. After the toilet they should thoroughly scrub their hands and finger-nails with soap and water and then wash them in a disinfectant solution. Ordinary washing of the hands with soap and water is not sufficient to cleanse or kill the germs on typhoid-polluted hands. A good disinfecting wash for the hands is a three per cent. solution of carbolic acid, creolin or lysol in water. Flies should not be allowed to come in contact with the discharges or soiled clothing of typhoid patients. They eat the discharges from the bowels and bladder and carry the germ-laden filth into the food and drink of other people.

OBSERVATION OF SYMPTOMS.

To intelligently observe the condition of the patient from time to time in order that she may make correct reports to the medical attendant is one of the most important duties of the nurse. Accordingly attention must be given to some of the symptoms which she will be expected to notice.

Temperature.—At stated times during the day, usually morning and night, it will be her duty in the large majority of cases to take and record the bodily temperature. A self-registering thermometer should be used, and after cleansing it the nurse should see that the column of mercury is as low as 96 degrees. If not, the thermometer should be firmly held by its upper end, with the arm raised and extended, and the thermometer swung downward with considerable force, care of course being taken to avoid striking it against anything. This process should be repeated as often as necessary, care being taken not to make the column of mercury go entirely into the bulb, or it will fail to be self-registering. The thermometer is usually held in the mouth, beneath the tongue, or in the armpit, five minutes being required to determine the temperature accurately in the latter place, while three minutes in the mouth is a sufficient time. If the armpit is selected it should be thoroughly dried and the thermometer held firmly in place by the arm being closely drawn to the side; if the mouth be chosen no cold drink should be given for at least ten minutes before and the lips should be kept tightly closed while the thermometer is in place. Care must also be exercised to prevent the thermometer being bitten, especially by children or by those who are at all irrational. With these the mouth had better not be chosen. The temperature normally is about 98½ degrees, although it is usually slightly lowered during the early morning hours and slightly raised in the early evening. In case of depression it may fall one or two degrees; in fever it rarely rises more than about seven degrees, and even at this height the patient is usually in a perilous condition. Between 100 degrees and 103 degrees the fever may be said to be moderate; above 103 degrees high. The gravity of high temperature varies in different diseases; in inflammatory rheumatism and in hysteria for instance the temperature may reach 108 degrees or more and recovery still take place, while a temperature of 105 degrees in inflammation of the bowels would indicate great danger. In very young children the best method is to take the temperature through the rectum. The child should

be laid face down on the lap and the thermometer gently inserted about an inch into the rectum and left there for five minutes. The temperature taken in the rectum registers about a degree higher than when taken in the mouth or armpit.

Pulse.—The pulse marks the movement of blood within the arteries, and the movement being caused by the contraction and expansion of the heart, there is variation in accord with the condition of the heart and the blood vessels. The pulse rate of the average adult is about 72 beats per minute, but varies greatly according to age, activity, position of the body and so forth. At birth the rate is 130 to 140; during first year 115 to 130; during second year 100 to 115; during third year 95 to 105; from seventh to fourteenth year 80 to 90; from fourteenth to twenty-first year 75 to 80. In old age the rate is from 80 to 85 per minute. The pulse of the female is more rapid than that of the male of the same age. Exertion, excitement and taking food quicken the pulse, and it is retarded by cold, rest and fatigue. The recumbent position causes a lowering of the pulse of about eight or more beats per minute. To count pulse place a finger (not thumb) over the artery at the wrist and count the beats for one minute. Full and frequent pulse (100 to 110) indicates fever; a bounding pulse (110 to 125) indicates high fever; a soft, frequent pulse (100 to 120) indicates advanced continued fever with debility; a wiry, frequent pulse, hard and not easily compressed, indicates fever with inflammation and that the disease is of serious character; a weak, intermitting pulse, or a thin, thread-like pulse, with or without short intermissions, indicates extreme prostration and may precede death or occur as result of hemorrhage or during a fainting fit. In such cases active stimulants must be promptly and energetically used. An intermitting pulse occurs in certain forms of heart disease, when the general health seems good.

Respiration (Breathing.)—Respiration is the alternate inspiration and expiration of atmospheric air. In drawing air into the lungs the ribs are raised and the diaphragm, or thin flat muscle which separates the cavity of the chest from that of the abdomen, is drawn down. The cavity of the chest is enlarged by this movement and simultaneously with the creation of vacuum the air rushes in as into a bellows. The movement of diaphragm and ribs which causes this inrush of air is caused by muscular contraction and the whole act is called inspiration, and the act of inspiration being completed the ribs return to their former position, the diaphragm rises, the lungs collapse and the air is forced out, and this act

of expulsion is called expiration. The successive movements of inspiration and expiration are known as respiration or breathing. In health the average adult breathes from 17 to 20 times a minute. Respiration in the female is usually a trifle faster than in the male, especially during pregnancy. The respiration should be regular and involve the muscles of both chest and abdomen. The following table indicates average respiration at various ages:

Two months to two years, 35 per minute.
Two years to six years, 23 per minute.
Six years to twelve years, 20 per minute.
Twelve years to fifteen years, 18 per minute.
Fifteen to twenty-one years, 16 to 18 per minute.

The number of respirations should be counted when the patient is unaware of it. This can be done by watching the rise and fall of the chest. The general nature of respiration varies in different diseases and should be carefully noted. In pneumonia and other pulmonary diseases there is a marked increase in respirations. In case of worms in children or any bowel trouble in infants, there is marked increase. Pleurisy, heart trouble causes shortness, gasping or catching of the breath. For record the respirations should be counted for a full minute and preferably when the patient is awake.

Cough.—If cough is present it should be noticed at what times it is worse, the frequency, duration and character of the paroxysms. If there is expectoration its features should be observed, its color, whether profuse or scanty, thick, tenacious, frothy, bloody, and so forth.

Discharges.—The discharges of the patient should be noticed and any departure from the normal reported. The frequency, color, consistence and general characteristics of the movements should be known. The color, odor and quantity of urine, the character of sediments, if any are present, the frequency with which it is voided, and so forth, should be ascertained. In saving a specimen for examination that which has collected during the night is to be preferred. Incontinence of urine, or the inability to retain it; and retention, in which it cannot be voided, sometimes occur. Occasionally in retention the bladder becomes overdistended and the urine dribbles away, this condition simulating incontinence. The use of the catheter will be necessary in this as in the ordinary form of retention.

Miscellaneous Symptoms.—The condition of the tongue, whether it is clean, furred, coated, flabby, indented, and so forth, and whether it is protruded slowly or quickly; the skin, as to moisture, warmth, color and gen-

eral appearance; the expression, whether wan, pinched, anxious, placid or otherwise; the eye, whether there is swelling of the lids, undue sensitiveness to light, alteration in color, or in the size of the pupils, and so forth; his general attitude and demeanor of the patient; the way he speaks, whether nervous, irritable, restless, rational; the amount and character of sleep; the extent and kind of delirium, if present; the sensations of the patient as described to the nurse; the location and character of pain—whether diminished or aggravated by pressure, whether constant or intermittent, stationary or movable.

UTENSILS OF THE SICK ROOM.

The following articles are practically indispensable in the sick room. They are not expensive and can be secured at almost all drug stores and of general dealers:

1. At least one, and if possible several, two-quart water bottles for purpose of either hot or cold applications as required. Cloth-covered water bottles are obtainable and to be recommended, as they prevent burning when hot water is used. If bag is not cloth covered a flannel cover-slip should be made and always put over the bottle prior to placing it with hot water against the patient. A bag that is wrapped in a loose flannel or towel may slip from its covering and burn the patient. Only fill bottle half full and then expel air before putting in the stopper. Where rubber bottles cannot be obtained or a greater number than on hand required, quart glass bottles wrapped in towels or flannels and securely fastened with safety pins may be used, but utmost care must be exercised that they do not break and scald the patient.

2. A good atomizer or sprayer for spraying the nose, throat, etc.

3. A graduated medicine glass for measuring liquids.

4. A glass tube for administering liquids to patients who cannot be raised and a special feeding cup for reclining patients.

5. Syringes and Douches: One bag or fountain syringe; one bulb syringe and one glass or hard rubber syringe.

6. Bedpan. There are several varieties, but the square, porcelain pan is especially to be recommended. The pan should always be warmed before using and the patient should be raised slightly at the hips when placing and removing the pan. It should be gently placed and gently removed. After using the pan should be immediately removed from the room, cleansed and kept in a convenient place outside the sick room.

In certain diseases, such as typhoid the evacuations should be thoroughly disinfected before emptying them. In all cases it is well to have a disinfectant solution at hand and keep some of it in bedpans and urinals when not in use. Two pounds of sulphate of iron and two ounces of carbolic acid dissolved in about five quarts of water is a good solution for such purposes and is so cheap that it may be used freely.

7. A bath towel; pure, moderately scented or unscented soap; a fine, medium-sized sponge; several rolls of antiseptic gauze bandage and a package of antiseptic gauze.

8. A slop jar with tightly fitting cover. Porcelain or china ones are good. They should be such as will stand the use of chloride of lime and other disinfectants.

9. A sputum cup. This may be of china or porcelain and must be covered. A small piece of chloride of lime or other disinfectant should be kept in the cup, which must be cleaned frequently. Gauze or old cloths should be used for sputum and these should be burned

10. One clinical thermometer for taking the temperature of the patient and one ordinary thermometer for judging as to the temperature of the room. A third thermometer specially adapted to taking temperature of the bath may also be secured, but when this is not convenient the ordinary house thermometer answers the requirements.

11. One small and one large pair of scissors and a good knife. Also where possible a manicuring set is to be recommended as it is important that the hands and nails of both nurse and patient should be kept continuously clean. Such utensils should always be sterilized.

12. Ice bag. This is a rubber cap or bag so constructed as to be filled with chopped ice and placed over the patient's head, a sponge being placed properly within to catch leakage as ice melts. The head should first be well bound with a soft moist cloth which protects the head from direct contact with the rubber but together with the sponge prevents the ice from having undue effect, as, should the ice be in direct contact with the head there would be danger of freezing. In severe fever cases and skull trouble the ice cap is invaluable.

THE BED.

In ordinary illness the wide bed placed so that the nurse can go to both sides and having a spring mattress covered with one of horsehair or other such material, is fully adequate and has one advantage over a narrow bedstead in that the patient may be refreshed by moving him to a

Changing Sheets—First.

Changing Sheets—Second.

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Properly Made Bed.

Ideal Sick Room.

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cool side of the bed. However, for most cases, and especially surgical cases, it is preferable to use a narrow iron bedstead about three feet wide, six feet three inches long and of a height to bring the patient two feet from the floor when the mattress is on. A good plan is to have two of these beds, one for the night and the other for the day, or for change at any time. By rolling the two beds close together the patient can be easily transferred.

Bedding.—Sheets, light blankets and hair mattress are proper. Blankets are usually better than coverlids, quilts and counterpanes because they are generally of lighter weight, and it is not well for the patient to be weighted down with heavy covering. A light counterpane, however, may be spread on top for sake of appearance.

Bed Making.—The careful making of the bed is not only important for the patient's comfort, but it is necessary as a preventive measure against bedsores. First lay a soft pad or blanket over the mattress to prevent irritation from mattress buttons. See that this pad or blanket is absolutely smooth and then pin it to the mattress at the corners with strong safety pins so that it may not become wrinkled. Cover the pad with a rubber sheet about three feet square which must be drawn smooth and pinned to the edge of the mattress. Over this place what is known as a "draw sheet" and which is made by folding an ordinary sheet lengthwise so as to make it half its original width. This is laid across the bed in such manner that the whole of the extra length will be on one side of the bed and so may be drawn to the other side to bring a fresh part under the patient. This draw sheet must be drawn tightly and smoothly across the bed and firmly fastened with safety pins. An upper sheet is smoothly laid and well tucked in under the foot of the mattress and the patient then covered with blanket and such light covering as deemed necessary.

Changing the Undersheet.—Commence on the opposite side from the patient and roll the sheet until it rests against him. A clean sheet should be previously folded in narrow, lengthwise pleats up to its middle and this pleated portion should now be placed against the roll of the old sheet, the remaining half covering the bare part of the bed, then push the two sheets well under the patient gently rolling him from you for the purpose. Going to the other side of the bed, roll the patient gently back over the sheets and pull them out. Then remove the soiled sheets and smooth out the fresh one. If desired the draw sheet and rubber sheet may be removed at the same time by rolling them all together. Another manner of changing the under sheet is to roll up the fresh sheet from the end, commencing

at the head of the bed, work the sheet toward the foot, the soiled sheet being pushed before it, the patient by himself or with assistance lifting successively the different parts of the body as the sheet is pushed down.

Changing Upper Sheet.—All the covering should be removed but the sheet and one blanket, on top of which lay a fresh sheet and blanket and then remove the soiled sheet and blanket from under the fresh ones. When sufficiently strong the patient may assist by holding on to the fresh sheet and blanket while the soiled ones are being removed.

Bed Sores.—It is not an uncommon thing for people who have been long confined to bed to die of bed sores caused by neglect and that oftentimes without either patient or nurse being aware of what is happening until the ill is done. They are to be especially watched for in emaciated persons. They form about the hips, down the spine, on the shoulder blades, the heels and other points where the tissues over the bones are so thin that constant pressure upon them stops circulation and a sore results. There is a noticeable redness first, and, if given attention at such time, the trouble may be stopped. The parts should be bathed frequently with warm water and castile soap and then rubbed well with alcohol and zinc stearate; the skin, too, may be toughened by using a solution of alum and alcoholic tannic acid powder. The most important thing, however, is that undue pressure shall not be permitted at any point. The patient should not be allowed to lie in one position hour after hour, but should be frequently though very gently moved. Turning the patient a little every three or four hours allows the blood to circulate through a part where it has become congested by the weight of the body or limb upon the bed. In some cases such as fracture of the hip it is not possible to frequently move the patient, but relief may be given by arranging small pillows in such manner as to support the body without the threatened part or parts coming in direct contact, or by placing an air pillow so that the affected parts comes over the opening. Care should be taken to use soft sheets and to see that they are always without wrinkles. A frequent massage of the back, hips and shoulders is helpful in preventing congestion of blood at any point. Wet beds are one of the most conducive things to bed sores and every effort must be made to keep both bed and patient clean and dry. When bed sores do appear everything possible must be done to heal them without delay as they may become a more serious matter than the original illness for which the patient is being treated. Cleanse with soap and water and solutions as has been directed, being careful to use only sterilized absorbent cotton, bandages, etc., and make every

effort to remove pressure on the afflicted part. If not carefully and properly attended to there is danger of blood poisoning.

EXTERNAL REMEDIES.

Poultices and Fomentations.—The effect of poultices is to soften and relax the tissues by the application of heat and moisture. In this way pain is relieved in many cases of inflammation, suppuration is prevented unless the process has gone too far, or if it is imminent or present it is hastened, and the healing of wounds and ulcerating surfaces promoted. If too long applied they do injury by lowering the tone of the parts.

Making and Applying Poultices.—Powdered slippery-elm bark, Indian meal or "mush," flaxseed meal, bread, or any similar substance which will retain the heat and moisture well, are employed. Hot water is gradually added to the material selected, until it is thick enough to stick to the wall if thrown against it. It is then spread quickly on a piece of thin material as muslin, to a thickness of about three-quarters of an inch, leaving a margin twice that wide. It is then covered by a similar piece of muslin, or preferably of thinner material, as cheese cloth and the edges turned to the affected surface, over which a little glycerine has previously been rubbed to prevent sticking. The poultice should be covered by a piece of rubber or some water-proof material to aid in retaining the heat and moisture. A hot poultice should be ready to replace the one in use as soon as it begins to cool. If used on the trunk, care should be taken to prevent catching cold by permitting only the briefest possible exposure of the heated part while changing the poultices, and after they are discontinued a thin sheet of cotton or a light flannel cloth should be applied as a protective.

Medicated Poultices.—Both poultices and fomentations may be medicated by the additions of antiseptics, laudanum, turpentine, and so forth, and materials having medicinal qualities, such as hops, poppy and digitalis may be used in poultice form for the relief of certain conditions by placing them in a bag, preferably flannel, and dipping into hot water, hot vinegar or hot alcohol.

Spiced Poultices.—Spice poultices or plasters are made in this way for mild counter-irritation in colic, and so forth, equal quantities of ginger, cayenne pepper, cinnamon and cloves being mixed together.

Pepper Plasters.—Pepper plasters are made of cayenne pepper the same way as spice plasters; or flour, pepper and water may be mixed to-

gether as an ordinary poultice, or to the white of an egg the pepper may be gradually added until of the proper consistence. The latter plan is said to have the merit of efficacy without causing much irritation and is useful in neuralgic affections.

Mustard Poultices.—These are made by mixing mustard flour with warm (not hot) water, and if desired adding a third or a half of wheat flour. The white of an egg may be advantageously added, or to relieve the burning the surface may be dusted after the poultice is removed, with a cooling powder, such as compound stearate of zinc with boric acid, or with menthol, or a soothing ointment such as cold cream, zinc ointment or vaseline. From fifteen to thirty minutes is a sufficient time to apply mustard poultices, the aim being merely to produce sufficient irritation to thoroughly redden the skin. Never should a blister be allowed to form, as the resulting sore is very painful and slow to heal.

Poke-Root Poultice.—Roast fresh poke-root until soft; pound it. Mix with cornmeal to consistency of poultice. Used on tumor to scatter them. Remove every four hours.

Charcoal Poultice.—Take bread and milk or Indian meal, make to consistency of poultice with water, stir in half a teacupful of pulverized charcoal. Good to clean ulcers and foul sores.

Slippery Elm Poultice.—Stir ground slippery elm bark in water to consistency of a thick paste. An excellent poultice for irritable sores.

Carrot Poultice.—Boil carrots until soft, mash them to a pulp, add lard or sweet oil sufficient to keep it from getting hard. Spread and apply. Excellent for offensive sores.

Onion Poultice.—Made the same way as carrot poultice. Excellent for slow boils and stimulating to indolent sores.

Bread Poultice.—Put needed quantity of boiling water in basin. Throw in bread or cracker. When these have soaked up all they will, pour off water. Spread half-inch thick on cloth and apply.

Lobelia Poultice.—Take one ounce each of powdered lobelia and ground slippery elm bark. Stir into hot weak lye to poultice consistency. Excellent when applied to wounds, fistula, felon, boils, erysipelas, insect stings.

Arrow-Root Poultice.—Mix two tablespoonfuls of arrow-root with as much cold water as it will unite with. Add boiling water and stir till a thick paste is formed.

Oatmeal Poultice.—Stir oatmeal slowly into hot water, boiling water

while stirring, till poultice thickness is reached—that is, till it will not run when spread on the rag.

Indian Meal Poultice.—Made same as oatmeal poultice.

Yeast Poultice.—Mix half pint yeast with one pound flaxseed meal to make thick paste. Stir constantly while heating.

Flaxseed Poultice.—Stir flaxseed into boiling water till thick paste is formed. Spread on linen and apply hot.

Compress.—Compresses are folded pieces of lint or rag so contrived as, by the aid of a bandage, to make due pressure upon any part, according to their shape, direction and use. Compresses have been called long, square, triangular, split, uniting, cubiform, and so forth. The compress of the hydropathists is a cloth well wetted with cold water, applied to the surface near the supposed seat of disease, securely covered with a dry cloth, and changed as often as it becomes dry. It is sometimes covered with a layer of oiled silk to prevent evaporation.

Fomentations (sometimes called "Stupes").—A fomentation is the application of relief to any part of the body by means of hot, wet flannels, which may or may not be medicated. Two or three pieces of flannel should be placed in the middle of a towel, which is then folded once over them. Dip this into boiling water and wring out by twisting the ends of the towel in opposite directions. Carry it to the bedside, take the flannels out together and quickly shake to let in air, which will cause them to retain heat longer. Cover the flannels with thin, dry towel and apply to affected part of patient. A teaspoonful of laudanum or turpentine sprinkled over the hot flannels will increase effect. A mustard stupe or fomentation is made by making a paste of one tablespoonful of mustard and adding this to one pint of hot water (not boiling, as boiling water destroys action of the mustard); then proceed as with other fomentations. In order to keep the fomentations continuously hot two sets of fomentations should be kept going at the same time, changing them every few minutes, one remaining on the patient till the fresh one is ready to take its place. When the fomentations are finally discontinued the part should be dried and a dry flannel put in its place to prevent the patient from taking cold.

Counter Irritants.—These include poultices, fomentations, etc., and may be applied directly over the seat of trouble or may be placed on some remote part to obtain what is called revulsive action. Thus headache is sometimes relieved by mustard footbaths.

Fly Blisters.—This is a mode of producing counter irritation by means of Cantharides or Spanish Flies, which at one time was much resorted to,

but now seldom adopted, and as a rule is only advisable under direction of a physician. Cantharides should never be applied where the skin is broken or tender. Oiled tissue paper between the plaster and the skin acts as protection to the skin and at the same time hastens the action of the blister. The part to be blistered should be thoroughly washed with castile soap and water, then putting on a little vinegar and permitting evaporation to do the drying. Where there is growth of hair it is well to first shave this off. The cantharides should be held in place by bandage and not by adhesive plaster, as in the latter case there is danger of breaking the skin upon removal. From six to eight hours is the usual time for blistering, and if this has not occurred within twelve hours, the cantharides should be removed and a poultice applied, when desired results will generally be produced. Great care should be exercised not to tear the skin in removal. All particles of the cantharides must be carefully removed by using oil, after which if the blister is full of watery matter or serum a small incision should be made at the bottom of the blister to permit of its draining out. The after application is simply cold cream, olive oil or other soothing application.

The Telini Fly, of India, as also a number of other flies, possess this blistering quality, owing to the cantharidin they possess, but the Spanish Fly is the one most commonly known and used. Practically the same results are secured by moistening gauze or cotton with chloroform or ammonia and applying as a blister. If left long such applications are apt to burn deeply and it is seldom advisable to use them excepting under direction of physician.

Packs, Hot and Cold.—The Hot Pack is given to accelerate active circulation of the blood and produce warmth. The bed is covered with a rubber sheet or oilcloth, over which a dry blanket is placed. Then a blanket which has been wrung out in boiling water is placed over the first blanket. The patient is laid on this hot wet blanket naked and the blanket then wrapped quickly about him so that each and every part of the body's surface is in contact with the hot blanket, which must be well tucked in at the neck and feet. The under blanket is then folded over the patient and snugly tucked in. A cold, wet towel is laid over the patient's head. The pack should be continued ten or fifteen minutes, when the patient is dried and put back into a warm bed, great care being taken that cold is not caught in this latter operation.

The cold pack is given in a similar manner to the hot pack, only on top of the first blanket a cotton sheet wrung in ice-cold water is sub-

stituted for the hot wet blanket. The cold pack is used to reduce temperature in many acute diseases, such as fevers, pneumonia, etc., but as a rule should only be given under direction of physician.

Dry Packs.—The dry pack is sometimes recommended as a means of producing perspiration. It is more particularly intended for full-blooded persons who would not be harmed by a reasonable depletion in avoirdupois. It is good for gout, rheumatism and some other chronic troubles, but must be avoided by those who are weak or anæmic, as it is very weakening in its effects. The patient is wrapped in a large, thick, woolen blanket in such thorough manner that no air can penetrate either at the neck, the feet nor elsewhere. Generally two or three blankets are used with a feather pillow at the feet, whilst an eiderdown quilt completes the wrappings, but still over this a further warm cover, which must be thoroughly tucked in. To avoid rush of blood to the head a cold compress is applied to the back of the head. The windows should be opened as soon as the patient is packed. The nurse must be in constant attendance and give the patient a glass of cold water every ten or fifteen minutes or oftener. After the dry pack the patient should be given a thorough alcohol sponge bath, and if sufficiently strong and the weather propitious will find it advantageous to take some outdoor exercise, or if condition does not permit of this should be put into a clean, dry bed.

Cupping.—Pain and congestion are sometimes relieved by what is known as "cupping." It is an operation requiring skill and care and is seldom advisable excepting under direction of a physician, especially as respects what is known as wet cupping.

In dry cupping the most convenient form is a set of glasses of different sizes, provided with valves, and from which the air is exhausted after closely applying the cup to the surface of the body by means of a vacuum pump. Several of these may be placed in succession along side of each other. As the vacuum is produced the skin rises in the cup and the blood flows to the part. When it is desired to remove the cup, the skin may be pressed near the cup so as to admit the air beneath.

In the absence of this cupping apparatus, the operation may be performed with small tumblers or wine-glasses with smooth edges. There should be at hand a lighted taper or candle, some alcohol in a glass and a small swab or fine brush. The glasses must be clean and dry. The part of the patient to be cupped should be exposed so that no time may be lost at the moment for cupping. Rub the inside of the cupping glass with the swab which must have been made sufficiently wet with the alcohol

to moisten the inside of the glass, but not enough to trickle down the side of the glass when turned upside down as this would result in more or less seriously burning the patient. Pass the inverted glass over the taper or candle flame when a blue flame will appear within the glass, lasting 3 or 4 seconds, and before it disappears place it over and press it upon the part to be cupped. The oxygen having been burned out of the glass a vacuum will have formed which will have sufficient suction to draw the flesh well up. Another glass should be ready for use as soon as the first one is released which it will the least of air entering. The second or succeeding cups should not be placed in precisely the same place, that is one glass should not be placed within ring formed by a preceding one. Be careful that enough alcohol is not used to heat the edge of the glass or drop on the patient. Remove the glass before discoloration appears. The top of the glass should be taken in one hand while the other is employed in pressing away the flesh from the edge.

Wet cupping is used for purposes of local blood letting in which, after dry cupping, the part is scarified with superficial incisions; the cups are sometimes replaced in order to promote the flow of blood. It is a practice which belongs, however, more to the domain of surgery than of nursing.

Leeches.—The use of the leech is mainly for local blood-letting. At one time the medical profession used them by the millions, but in modern times the practice has greatly diminished, indeed the younger generation of American and European medical men seldom or never employ them. They are to be found in America and in Europe, the latter being considered the better for medicinal use because they are more voracious and will suck in four or five times their weight in blood.

It is possible for leeches to cause severe hemorrhage and for this reason they should not be applied over large blood-vessels, but instead should be placed upon a bony surface upon which pressure can be made in case it is necessary to check the hemorrhage, and not only should special attention be paid to this where leeches are applied to children, but as they are more easily acted upon by the leech than are adults, the less voracious or American leech is the preferable for use. The surface to which the leech is to be applied should first be well washed and dried and the leeches —which should also be washed and dried in a towel or the like—should not be handled. If to be used in the mouth or nose, run a silk thread through the tail to prevent swallowing. If swallowed a strong solution of salt and water will prevent any harm, or a glassful or two of wine may

be taken. Should hemorrhage be severe it may be stopped by application of vinegar or by touching with nitrate of silver. Simple hot or cold applications with pressure are usually sufficient. Do not attempt to pull a leech off by force as their teeth may be left in the wound and abscesses may result or erysipelas set in. The leech will drop off itself when it is full or if desired before he is full sprinkle some salt on the head of the leech, when it will immediately release itself and drop off. The bite of the leech leaves a small, permanent star-shaped scar.

Lotions, Ointments, Embrocations, Liniments.—Lotions are remedies applied to the exterior of the body by simply painting, washing or mopping the surface. If they are intended to reduce heat and inflammation by evaporation they should be left without covering or as little as possible. Ointments are fatty substances applied either with or without rubbing and are usually supposed to be of more or less healing nature. Embrocations and liniments are usually somewhat counter-irritant and are external applications in which rubbing is employed. Usually liniments contain ingredients that would be very poisonous if taken internally and so great caution should be taken that they are not left where someone may take them by mistake, or even as has sometimes happened, administer them by mistake.

Sulphur Ointment.—Melt half a pound of lard, and add one ounce sulphur, one drachm each of ammoniated mercury, benzoic acid, sulphuric acid and oil bergamot, and two drachms of nitrate of potassa. Stir constantly till cold. An excellent ointment for itch.

Pile Ointment.—Add to a quart of water three handfuls each of witch-hazel bark, oak bark and apple tree bark. Boil to a pint and strain. Add half a pound of lard, and simmer till water disappears. This forms an ointment valuable as a pile remedy.

Tar Ointment.—Melt a pound of suet. Add the tar. Stir till cold. Excellent ointment for scaly eruptions like scald head.

Spermaceti Ointment.—To a pint of olive oil add five ounces of spermaceti and fourteen of white wax. Melt together, stirring constantly. Good dressing for blisters and burns.

Simple Ointment.—Melt a pound of white wax with four pounds of lard. Let the heat be gentle, and stir till cold.

Poke Ointment.—Mix a drachm of extract of poke with one ounce of lard. Good for ulcers, itch, scald head, etc.

Oxide of Zinc Ointment.—Rub together half an ounce of oxide of

zinc and three ounces of lard. Good for eruptions of skin and sore nipples.

Ointment of Galls.—Rub together six ounces lard, six drachms powdered galls and a drachm and a half of pulverized opium. Good for piles.

Belladonna Ointment.—Mix an ounce of lard with a drachm of extract of belladonna. Affords relief in neuralgia and painful tumors.

Ointment of Bayberry.—To half a pound of tallow add half a pound each of turpentine and bayberry, and four ounces of olive oil. Good application for scrofulous sores and ulcers.

Lead Ointment.—Add two and a half drachms of powdered acetate of lead to two ounces of white wax and four ounces of lard. Melt together, stirring till cold. Good for burns, scalds, ulcers and cuts.

PLASTERS.

Spiced Plaster.—Mix an ounce each of powdered ginger, cloves, cinnamon and black pepper with one drachm pulverized cayenne. Add a fluid ounce tincture of ginger and enough honey to make stiff poultice. A plaster of this applied to stomach stops nausea and vomiting.

Lead Plaster.—Melt one pound lead plaster, add two ounces each of linseed oil and tincture of opium, six ounces of oil of turpentine and eight ounces of oil of organum. Stir together till cold. Good for burns, chilblains, scalds, etc.

Capsicum Plaster.—Mix half pound resin and two ounces beeswax. Add a pint of spirit, in which two ounces of cayenne inclosed in bag has been steeped in gentle heat for two hours. Evaporate the spirit by gentle heat, add an ounce of powdered camphor. An excellent stimulating plaster.

Belladonna Plaster.—Melt three ounces of resin plaster and add an ounce and a half of extract of belladonna. An excellent application in neuralgia and rheumatism.

Dry Heat.—This is used to impart warmth, restore suspended animation, relieve pain, as in cases of neuralgia and muscular rheumatism and in other affections. Appliances are now procurable for use in the home in which the affected part may be treated by air heated to a temperature of several hundred degrees. Hot water bags and bottles, hot stove lids, irons, bricks and plates, bags of salt, sand and ashes are common examples of the modes of applying heat. All these should be properly wrapped to prevent burning the patient. Where bottles or rubber bags are used the stoppers

should be carefully fitted to prevent the possibility of leaking; the bag should be seamless lest the heat melt the cement and the patient be scalded, and it should only be half filled in order that it may conform more comfortably to the shape of the body.

Cold.—Cold is applied for the reduction of temperature, for the relief of inflammation and sometimes in the treatment of pain. Muslin cloths laid on ice, constantly renewed, cloths wrung out of ice water and rubber bags partially filled with small pieces of ice are the ordinary means of applying it. Coils of rubber tubing through which ice water is made to flow are also convenient. The same may be used for hot water. Ice bags should have between them and the surface of the skin a thin layer of flannel or other material. If folded in a napkin or other cloth they may be conveniently pinned to the clothing of the patient, or where applied to the head, to the pillow, to keep in position.

Miscellaneous Application of Remedies.—Remedies are also applied to the mucous surfaces by injection, suppositories, douches, inhalation, dusting, and so forth, by absorption through the skin into the general system; and by injection under the skin or into the deeper structures of the body. The utmost care should be observed to have all appliances used for these purposes scrupulously clean to avoid the danger of infection. Of these methods several must be more than mentioned.

BATHS.

The temperature of water in a bath in the sick room should always be tested with a thermometer. Never trust to impressions nor hand tests,—they are unreliable and may be sufficiently in error to cause grave consequences. A special bath thermometer may be obtained from any drug store, but the ordinary thermometer answers all requirements. For clinical consideration the temperatures of different kinds of baths may be classified thus:

Cold bath	50° to 70° F.
Tepid bath	80° to 92° F.
Warm bath	92° to 98° F.
Hot bath	98° to 110° F.

Cold baths induce capillary circulation and stimulate a healthy action of the skin, fortifying it against atmospheric changes. The cold

water drives the blood from the surface to the internal organs and this is followed by a reaction, and as the blood returns there is a feeling of warmth and a reddening of the skin. For those in health a cold plunge first thing in the morning is most exhilarating, but should not be taken for several hours after eating. With the sick the cold bath should only be given on physician's order, excepting in cases where his advice cannot be had and it is known that it is the proper treatment. It is sometimes indicated for heatstroke when the temperature reaches 104 degrees or more, but the patient should not be plunged into the extreme cold as a well person would do, but instead the water at the start should be at a temperature of from 70 to 90 degrees and gradually it should be reduced by adding cold water until the desired temperature is reached, say 65 degrees F. or at lowest 60 degrees. The patient according to circumstances may be kept in the bath for fifteen to thirty minutes, but if at any moment there be symptoms of faintness or of chills, he should be immediately taken out and hurried to a warm bed, where stimulants should be administered.

Hot baths and hot packs draw the blood to the surface and relieve congestion of the internal organs. They are of special worth in cases of shock, exposure to cold and like instances, where there is great depression and it is requisite to stimulate the nervous system. They are used to great advantage in cases of convulsions of children. On taking him from the bath the skin must be quickly but gently dried and the patient hastened into a warm bed, care being taken throughout that the temperature of the room is proper and that there are no draughts. Hot baths may produce faintness and the patient should be continuously watched, as if left alone even briefly there is danger of sudden collapse and possible drowning in the bath.

Warm and Tepid Baths.—These have a calming, soothing effect upon the nervous system. They are of especial value when there is excitement or irritability.

Hip Baths.—These are given with intent to act specially upon the abdominal organs. They may be hot or warm. They should be given in baths specially constructed for the purpose and which can be readily purchased, but in emergency an ordinary tub may be used. Care must be taken that the patient's shoulders and feet are warmly covered during the period of the bath.

Foot-baths.—These are often valuable in refreshing the patient and also in drawing cold from the system. For the former the water should be tepid and the duration from five to ten minutes. For the latter the

water should be as hot as the patient can bear and kept up for from ten to twenty minutes, hot water being added to keep up temperature of water. A tablespoonful of mustard should be stirred in the water, and it will aid if the patient's ankles and feet are gently rubbed downward.

For description, etc. of other kinds of baths read special articles.

ENEMATA, OR RECTAL INJECTIONS.

Liquids injected into the rectum are called enemata (plural of enema) and are given for various purposes, such as the relieving of constipation, the checking of diarrhœa, the relief of flatulence, etc., when they are called simple enemata, and also are given to administer nourishment which cannot be taken into the stomach, when they are called nutritive enemata. Simple enemata may be administered either with a bulb syringe or with a fountain syringe; that is, a water bottle hung at convenient height above patient and having connecting rubber tube with proper nozzle. Fluids as a rule should be warmed to a little above blood heat (98° to 100° F.), say from 105° to 108° F. The most enemata consist of warm water made soapy with any good soap and is simply for the purpose of evacuating the bowels. The tube should be oiled with vaseline or sweet oil and gently pushed into the rectum by an upward and slightly backward movement. The tube is held in place while the injection is slowly given. The following details as to different enemata will be found of value:

1.—Purgative Enemata:

(a) Olive oil or castor oil. Six ounces of warm oil should be injected slowly and as high as possible, its purpose being to soften the movement. About half an hour afterward follow with an enema of one quart of warm soap suds.

(b) Glycerine enemata. Half an ounce to two ounces of pure glycerine with an equal amount of warm soap suds should be injected.

(c) Turpentine enemata. Mix one-half ounce of turpentine with three ounces of warm water. Half an hour afterward follow by an enema of about one pint of soap suds.

(d) Rochelle salts and epsom salts. One ounce of either salt should be mixed with two teaspoonfuls of turpentine and one pint of warm soap suds.

(e) Molasses. Mix from two to ten ounces of molasses with one pint of warm soap suds.

2.—Astringent Enemata: These are oftentimes found very efficacious in cases of diarrhœa. They must be given very slowly, should be injected as high as possible and be retained by the patient as long as he is able to.

(a) Starch and laudanum. The starch is boiled as if for laundry purposes and then thinned with lukewarm water until it is thin enough to flow readily through the tube, and of this take three ounces. In mild cases this of itself is often sufficient, but where there is much pain, desire to move the bowels and straining, fifteen drops of laudanum or thirty drops of paregoric may be added, but this addition should not be made without permission of physician.

3.—Stimulating Enemata: These are sometimes found valuable in cases of shock following an accident or in cases of exhausting illness, where it is deemed wise to stimulate through the rectum.

(a) Salt Enema. A mildly stimulating enema may be made with two teaspoonfuls of salt dissolved in one quart of hot water. This may be strengthened in effect by addition of half an ounce to one ounce of whiskey.

(b) Black Coffee. An injection made of half a pint to one pint of black coffee makes a powerful stimulant. It should be first strained through a handkerchief or fine cloth and administered as hot as can be endured.

4.—Nutritive Enemata: In some cases it is necessary to feed the patient through the rectum. Naturally but a very limited variety of food can be thus administered. No one injection should consist of more than four to six ounces of fluid, and they should not be given oftener than at four hour intervals, as if more frequently administered the rectum will become so sore that they will have to be discontinued. In giving nutritive injections make sure that there is no air in the syringe, and to avoid their being expelled they must be administered very slowly. In case of being expelled decrease the dose. The smaller and more concentrated the dose the greater is the chance of its being retained. Where there is great difficulty of retention ten drops of laudanum or paregoric added to the enema will sometimes effect retention. The following are some of the most efficacious nutritive enemata:

(a) Four ounces of peptonized milk; white of one egg; a pinch of salt.

(b) Three ounces strong beef tea; one ounce cream; one ounce brandy.

(c) Two ounces each of beef blood and pure milk. The beef blood should be from very rare beef.

(d) One ounce each of yolk of egg, milk, brandy and beef-tea.

(e) Two ounces of egg-nogg (made as for drinking) with two ounces of codliver oil, or four ounces of the egg-nogg may be given without the oil.

When a patient is being fed by nutritive enemata the bowels should be washed out once a day by simple enema.

In giving an enema the patient should preferably lie on the left side. If impossible to lie on the left side then he should lie on his back or take it in the "knee-chest position"—that is, with the knees drawn up to the chest. The patient must never be given an enema while lying on the right side.

In giving enemata the bed of course should be protected with rubber sheet or with proper cloths.

EPIDERMIC MEDICATION.

Feeding the patient through the agency of the skin is known as epidermic medication. It is only used in rare cases, though some constitutional diseases are still treated with mercurial inunction and cod liver oil is sometimes applied to the skin of consumptives and rubbed in by massage. Epidermic medication should only be administered by direction of a physician.

HYPODERMIC INJECTIONS.

These should never be used excepting by direction of the physician, yet when he prescribes them they may be easily administered by the nurse and quick results in stimulants and other drugs are obtainable and sometimes advisable. Tablets and triturates are now obtainable which physicians feel safe in prescribing for hypodermic use. The operation is very simple. A proper hypodermic needle must be had and this must be carefully sterilized by boiling in hot water or by subjecting carbolic acid or alcohol, both before and after each injection. Make solution as directed by the doctor, then with a piece of gauze rub the part to be pierced with alcohol to bring the blood to the surface. With the thumb and index finger of the left hand pinch up a little piece of the flesh and with the right insert the needle with a quick, stab-like motion. Press the piston slowly, permitting the solution to diffuse, then quickly withdraw it and again rub the part with alcohol. The patient will feel almost no pain.

VAGINAL INJECTIONS AND DOUCHES.

These are necessary for cleanliness and as palliative in different diseases. Either bulb or fountain syringe may be used, but probably there is nothing more satisfactory than a good fountain syringe, which is simply a rubber bag or other vessel for holding one or two quarts of water, which can be hung on a hook or set on a shelf about six feet from the floor, or other height sufficient to give natural force to the flow of water. To this vessel a long rubber tube is attached with a nozzle at the end. There should be at least two interchangeable nozzles, one providing for a straight flow of water and the other for a spray. A snap spring about the tube near the nozzle may be used to start or shut off the flow of water. The patient should lie on her back with the hips raised on pillows and the knees drawn up, a bedpan being placed under the hips to catch the returning water. Where this is not possible the patient should lie at the edge of the bed with a vessel arranged to catch the overflow. The nozzle should be oiled and then gently introduced and held in place by the patient while the nurse gives the injection. An improvised fountain syringe can be made by placing a pitcher at a suitable height and using a piece of rubber tubing as a syphon. Of course with well persons and that especially with the fountain syringe, douches may be taken without assistance. The injections may consist of warm or hot water, to each pint of which, if desired, a teaspoonful of Condy's fluid or of a five per cent. solution of carbolic acid may be added.

SUPPOSITORIES.

These are small masses, usually conical in shape, and composed of cocoa butter or some other material which will melt at the temperature of the body. These masses are medicated to suit requirements of different ills. They are used for introduction into the rectum, vagina or uterus, and, except in the case of the last named, readily slip into position if lubricated with a little oil or vaseline. They may be introduced by patient or nurse. If introduced by nurse the forefinger should be oiled. The suppository should be introduced gently, and when by rectum should be pushed up about one inch until it is seized by the muscles. The finger should be withdrawn very slowly so that the suppository may not be forced out. When patient has not been accustomed to introduction of supposi-

tories an evacuation may follow in a few minutes and a bedpan should therefore be in readiness. As suppositories melt at body heat they should be kept in a cool place.

INTERNAL REMEDIES.

Liquids, powders and pills and the modifications of the latter, tablets and capsules are the modes by which medicines are administered internally. As much as possible an array of medicines should not be on exhibition in the sick room. Any which in their administration require special care, such as poisons, should be kept in a place by themselves and some means adopted for distinguishing them by the sense of touch, such as a piece of ribbon tied about them.

Pills and Powders.—To give pills, powders, etc., they should be placed as far back on the tongue as possible and a large swallow of water taken. Some powders are quite readily taken by floating them on a teaspoonful of water, others by mixing them into a paste with a few drops of water and placing on the tongue, a drink being taken to wash it down. Medicines in liquid form, unless specific directions to the contrary are given, had usually better be freely diluted. The mere addition of water does not usually diminish the efficacy of a drug, whereas when undiluted remedies are often too strong.

Measuring of Medicines.—Since spoons vary in size and drops differ according to the consistence of the liquid, droppers and graduated medicine glasses are better for measuring liquids. One teaspoonful should equal a drachm, two teaspoonfuls a dessertspoonful, two dessertspoonfuls a tablespoonful, two tablespoonfuls an ounce, two ounces a wineglassful, two wineglassfuls a teacupful, two teacupfuls a coffeecupful, and two coffeecupfuls a pint. In measuring liquids, the glass should be held perfectly even, on a level with the eye, and the liquid slowly poured out from the bottle, on the side opposite the label, to prevent soiling the latter by drops rolling down the outside. If the medicine is measured by a spoon, it should be poured into a larger receptacle in order that it may not be spilled while administering it. In dropping from a bottle, the lip should be moistened in one spot with a drop of the liquid, and side of the cork held against the moistened edge at an angle of about 45 degrees; if the bottle is carefully tilted its contents may be accurately dropped out.

TINCTURES.

A tincture is a spirit containing medicinal substances in solution—that is to say, it is a spirituous solution of such of the active principles of vegetables and animals as are soluble in pure alcohol or proof spirit. They are made by grinding or bruising the substances of which tinctures are to be made, such as roots, leaves, barks, etc., and then placing them in the proper amount of either diluted or pure alcohol, letting them stand from seven to fourteen days (shaking thoroughly each day) and finally filtering through paper. Commonly one ounce of the medicinal substances is used to one pint of spirit, though there are some variations as to this. As a rule fluid extracts have the same strength ounce for ounce with the roots, barks, etc., of which they are made, so that they may generally be used instead of the actual substances and facilitate the making of a tincture quickly. Ether is sometimes used instead of alcohol, as is also ammonia. The following are a few of the tinctures most commonly used, together with description as to their making:

Tincture of Snakeroot.—Steep for two weeks three ounces of crushed Virginia snakeroot in a quart of diluted alcohol. Express and filter. Good for low states of the system, in teaspoonful doses, three times a day.

Tincture of Rhubarb.—Add to a quart of diluted alcohol three ounces of crushed rhubarb and one ounce of crushed cardamom. Steep two weeks; express, filter and bottle.

Tincture of Opium.—Add to two pints of diluted alcohol two and a half ounces of opium. Steep for a fortnight; express, filter and bottle. This is the preparation known as laudanum. The dose should not exceed ten to twenty drops.

Tincture of Lobelia.—Add to a pint each of vinegar and alcohol four ounces of lobelia. Steep two weeks; draw off and filter. Dose as a nauseant, thirty to fifty drops.

Tincture of Cinnamon.—Add to one pint of diluted alcohol two and a half ounces of powdered cinnamon. Steep for two weeks; express and filter. Dose, two to four teaspoonfuls.

Cayenne Pepper Tincture.—Steep for two weeks an ounce of powdered cayenne pepper in two pints of diluted alcohol. Express, filter and bottle for use.

Tincture of Orange Peel.—Add to one quart of diluted alcohol four

ounces of dried orange peel. Steep for a week; express, filter and bottle for use.

Tincture of Cantharides.—Steep for a fortnight an ounce of crushed Spanish flies in two pints of diluted alcohol. Dose, twenty drops, three times a day.

Tincture of Valerian.—Steep for a fortnight four ounces of crushed valerian in a quart of aromatic spirits of ammonia. Express and filter. Used in nervous diseases in one- or two-drachm doses in sweetened water.

Tincture of Myrrh.—Steep for two weeks four ounces of crushed myrrh and two ounces of capsicum in four pints of alcohol. Express and filter. Good externally and as an occasional remedy for flatulence.

Tincture of Peruvian Bark.—Steep for two weeks twenty ounces of diluted alcohol, to which has been added two ounces of red bark, an ounce and a half of crushed orange peel, three drachms of Virginia snakeroot and one drachm of saffron. Express and filter. A stomach cordial, and good in low fevers. Dose, two to four drachms three times a day.

Tincture of Aconite.—Mix eight ounces of powdered aconite root with one pint of alcohol. Express and filter. Same proportions of castor and leptandra to alcohol, make their respective tincture.

Camphor, oil of peppermint, oil of spearmint and asafetida, in proportions of two ounces each to a pint of alcohol and steeped and treated as in tincture of aconite, make their respective tinctures.

So cardamom, cochineal, colombo, ergot, galls, hemlock, cubebs, henbane, lobelia, poke, blood-root, squills, bittersweet and belladonna, in proportions of two ounces each to a pint of diluted alcohol, and steeped and treated as in cases of tincture of aconite, make their respective tinctures.

SYRUPS.

Syrups are frequently used in the sick room. A strong solution of sugar and water is a simple syrup and when some medicinal has first been put in the water it is a compound or medicated syrup. In making medicated syrups it is preferable to use refined sugar. The following recipes will be found useful in making syrups for the sick room:

Simple Syrup.—Dissolve two and a half pounds of sugar in a pint of water. Dissolve sugar by heating, removing any scum. Strain while hot. The addition of any medicinal substance to a simple syrup makes a compound syrup.

Syrup of Squills.—Add two pounds of refined sugar to one pint of vinegar of squills, and proceed as in simple syrup.

Syrup of Seneka.—Mix four ounces of fluid extract of seneka with one pint of water. Dissolve in the liquid one pound of refined sugar and proceed as in simple syrup. Useful in colds and coughs, in frequent doses of one or two teaspoonfuls.

Syrup of Rhubarb.—Add to six pints of simple syrup, two-and-a-half ounces of crushed rhubarb, half ounce each of crushed cloves and cinnamon, two drachms of bruised nutmeg, two pints diluted alcohol. Evaporate liquid by a gentle heat, to a pint. Excellent for bowel complaint, in drachm doses every two hours till it operates.

Syrup of Lemons.—Boil for ten minutes a pint of lemon juice, strain, add two pounds refined sugar and dissolve. When cold, add two-and-a-half fluid ounces of alcohol. A fine addition to drinks in fever cases and good to disguise the taste of medicines.

Syrup of Citric Acid.—Add one pint of simple syrup to two drachms of powdered citric acid and four minims oil of lemons; add another pint of simple syrup and dissolve by gentle heat. An agreeable cooling addition to fever drinks.

Syrup of Ginger.—To a quart of simple syrup add two ounces of tincture of ginger. Evaporate the alcohol by gentle heat. Added to other medicines to improve flavor. Excellent to remove wind from stomach and as a stimulant.

Syrup of Garlic.—Slice and crush six ounces of fresh garlic, add one pint of acetic acid and two pounds of sugar. Macerate four days in glass vessel. Express and filter the liquor, till a pint has passed. Bottle. A teaspoonful will relieve bronchial affections in children under one year old. Larger doses according to years.

Syrup of Wild Cherry.—Steep two and a half pounds coarsely powdered wild cherry bark in a gallon of water. Strain and dissolve in it by heat as much sugar as will make thick syrup. A good tonic and excellent to mix with medicines for dyspepsia, consumption, and so forth.

Emetics.—Emetics are medicines administered for the purpose of causing vomiting. Generally they are considered as being of two varieties, which may be classified as (a) those which produce their effect by being absorbed into the blood and thereby act upon the nerve centres, and (b) those which act directly on the mucous membranes of the stomach and cause vomiting by reflex action. The first class of emetics are slow in their operation and are attended by considerable depression of the system

and antecedent nausea, while the latter are prompt in action and their depressing effect much less. Formerly emetics were much used in medicine in the early stages of acute diseases, such as fevers and inflammations, with the object of cutting them short, but their use for such purposes has practically been discarded and they are seldom used excepting in specific cases, such as the following: to empty the stomach in certain cases of poisoning, such as narcotics, or where indigestible substances are giving rise to disturbances which call for their removal, and to clear the air passages of obstructions as in certain cases of bronchitis or croup, where the respiratory tubes become filled with morbid material which threatens death by asphyxia and which cannot be dislodged by coughing. For these purposes class (b) or stimulating emetics are preferable, such as sulphate of zinc, sulphate of copper, turpeth mineral, alum, ipecac, sanguinaria, mustard, salt, etc. A common household emetic is a teaspoonful of mustard stirred in a glass of lukewarm water. Sometimes a couple of tablespoonfuls of table salt in a glass of lukewarm water will give results. Emetics in class (a) are frequently administered by the rectum or hypodermically when the patient cannot swallow or for other reasons it is not desirable to disturb the stomach by direct action. Emetics are also sometimes given in class (a) to produce nausea, rather than actual vomiting, thereby causing a certain relaxation in the early stages of acute inflammation in strong persons, and for this purpose the more depressing emetics are used, such as antimony, ipecacuanha, apomorphia, etc. The latter are also employed in obstetric practice with view of producing relaxation in cases of protracted labor from uterine and muscular rigidity. Emetics should always be administered with great caution, since the act of vomiting may be attended with danger where there exists any tendency to brain disease such as apoplexy, congestion of the brain, etc., and also in cases of inflammation of the stomach, advanced pregnancy, hernia (rupture) and other diseases of the internal organs, emetics should be avoided.

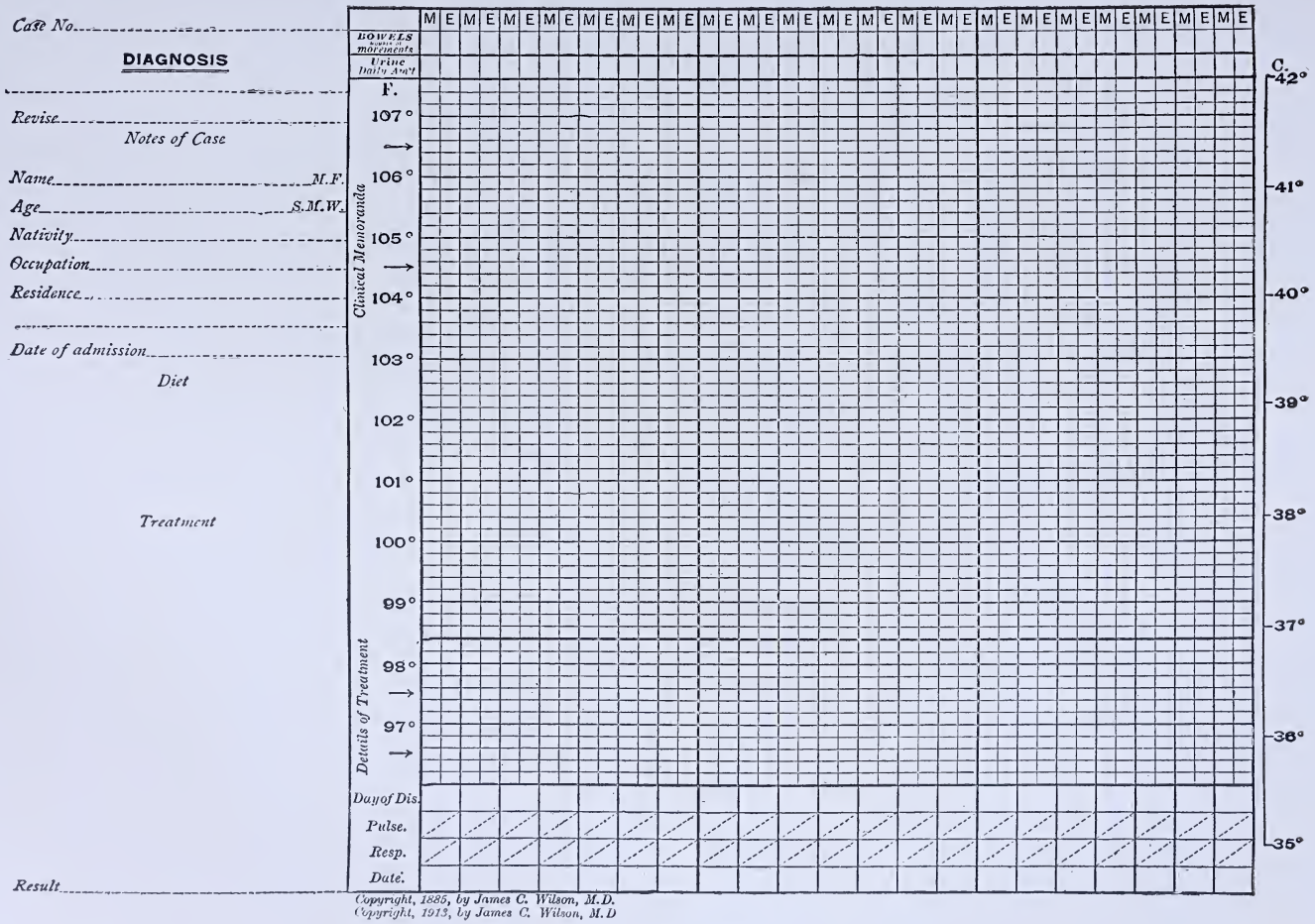
KEEPING A CHART AND RECORD.

A proper sick room chart carefully and accurately kept is of great assistance to the physician. The doctor usually is able to spend but a few minutes with the patient each day, usually at about the same hour each morning or afternoon. He cannot tell just what has happened during the time he has been away excepting by report of someone who has watched the case during his absence, yet it is very important that he should

know just what has transpired each hour, what the temperature has been, what the pulse, what food has been partaken of, what bowel movements there have been, and many other things. The nurse cannot trust to her memory and, moreover, to recite all details would take up a lot of time. A carefully kept chart will tell the physician just what has happened while he has been away and will enable him to more ably decide as to what course should be pursued in treatment. Almost all drug stores have sick room or nursing charts for sale, and the purchase of same will well repay. Where these charts cannot be purchased the nurse can easily draw a necessary chart, taking as guide the specimen diagrams on the opposite page hereto. The date, name of patient and name of physician and when he has decided as to the disease write in the name of that also. Each time pulse, respiration and temperature are taken record them on the chart. The dotted line running across the page at 98.6 indicates the normal temperature line. Any variation from this line shows an irregularity in the system. After recording the figures (expressing fractions in decimals) make a dot on the chart showing the temperature. Then when the temperature next taken make another dot again showing the temperature and draw a straight line from the previous dot to the new one, and so one each time temperature is taken. By using black ink for day records and red ink for night records the physician is greatly assisted in quickly reading the chart. On separate sheet should be kept memoranda of everything occurring during each day and each night, including meals and what composed of, discharges and their nature, hours of sleep, etc., in short stating in fewest words possible everything as it occurs. Put it down at the time.

That the chart and record be absolutely correct is imperative, as an inaccurate report is not only useless, but may prove truly dangerous by giving the physician false impressions, while every physician is aided and every patient benefited by a true chart and record.

Moving a Patient.—No one should attempt to lift a sick room patient alone. There should at least be two. There are different methods. One good way is for the nurse to pass one arm under the patient's neck in such manner that the head will rest on her arm, the nurse's hand being passsed under the arm of the patient on the other side; the nurse's other arm is passed over the patient, the hand reaching the middle of the patient's back. The assistant, standing on the opposite side from the nurse, passes one arm under the lower part of the back and the other under the knees, and the nurse and assistant operating in accord with



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Temperature Chart.

Name .....

Date, ... 19

Hours	Temp.	Pulse	Res'n	Urine	Stool	MEDICINE	STIMULANT	NOURISHMENT	REMARKS

Daily Record.

each other lift the patient. A patient also may be lifted by the nurse taking firm hold of the sheet at the head and the assistant in like manner at the foot. The sheet thus forms a sling, and if done carefully and with sufficient strength the patient may thus be safely carried. In moving a patient from one side of the bed to the other, the nurse may by herself safely undertake to do this by placing one arm and hand down the patient's back, thus supporting the head and shoulders, the other hand and arm being passed over the patient and slipped under the upper part of the back—and thus the upper part of the body is moved in the bed. Then one of the nurse's hands is placed under the lower part of the back and the other under the knees, and thus the lower part of the body is lifted over. The patient also may be moved from one side of the bed to the other by loosening the draw sheet and pulling it and the patient over together, then of course replacing the sheet.

FEVER NURSING.

By "fever," as here used, we do not mean merely a high temperature. One may have high temperature for a short time as the result of an attack of indigestion or other temporary disarrangement of the system, while in typhoid and other continued fevers to which we now refer, the temperature is not necessarily excessively high, though at times it may be, but it goes through a series of ups and downs, now rising, now falling, always above normal and probably the risings and fallings being at a little higher temperature each day during a certain period of the illness, according to the nature of the particular disease.

In these continued fevers the patient's recovery depends more on careful nursing than in probably any other sick-room illness, and that the nursing of it may be given all the faithful and untiring care that is essential, it is necessary that the nurse herself have very special regard to her own health, and that she herself has nourishing food, ample rest and sufficient outdoor air and exercise to keep her in good health and cheeriness. The nurse who neglects her own health is unable to give the best care to her patient, for if she be over-tired or ailing herself she cannot be as vigilant as she should with her patient nor can she lighten the sick room with that quiet, but contagious cheerfulness which is always a potent factor when caring for the sick. The nurse must have her hours of rest and recreation and these as far as possible must be away from the sick room and from thought of it. This is as much in the

interests of the patient as the nurse, oftentimes more so. Where it is possible to have two regular nurses, the matter is very simple by a division of hours, but where, as is generally the case, only one trained nurse may be had, or only one member of the family able to devote her entire attention to the patient, it is necessary that special arrangements be made for the regular relief of the nurse, whether she be a trained nurse from without or be one of the members of the family. Certain hours when the patient is least likely to need special care should be decided upon and someone regularly left in charge during those hours with full instructions what to do, and the nurse thus be given entire freedom that she may come back to her case refreshed and so physically capable of resuming untiring watch and care. There should be a free discussion of the matter with the attending physician in order that the best hours and best general arrangement may be had.

As illustrative of fever nursing we will take a case of typhoid fever. Typhoid fever is caused by poisons produced by myriads of microscopic germs in the bowels which live their lives in series of sevens of days. It is called an "expectant" fever because it is expected the germs will live out their lives in series of seven, fourteen, twenty-one or twenty-eight days. The fever seldom runs less than fourteen days; it rarely exceeds twenty-eight days. Once it has started it must run its course, and so once it has been fully established that the case is typhoid we must settle down to a watchful siege, hoping for the change to convalescence on the fourteenth day, and if this passes without crisis then on the twenty-first day, and in the meantime, by natural and artificial means, bend our energies to preventing the fire of fever from consuming the patient and in keeping up the strength and vitality which are essential to his recovery.

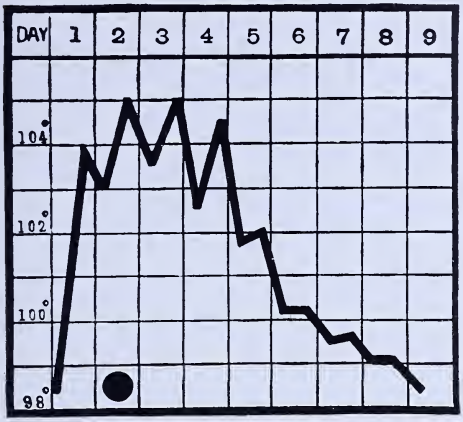
Strict rules apply to the management and care of these fevers (see article on typhoid fever and other fevers as per index) and no liberties can be taken. Where competent physician is in attendance, obey his instructions religiously. Diet, sponging, attention to urine and stools and all the many incidents of proper care should be given careful, incessant and unwavering attention. The keeping of exact charts and records is matter of especial importance in these fever cases, as they are an index to the patient's real condition and invaluable to the physician in his daily study of the case.

Delirium is almost always an accompaniment of continued or expectant fevers, especially during high fever, and patients of nervous temperament. The patient is restless during sleep and usually keeps up

Temperature Charts for Various Diseases

The Time Eruption Appears is Shown by the Black Spots

SCARLATINA



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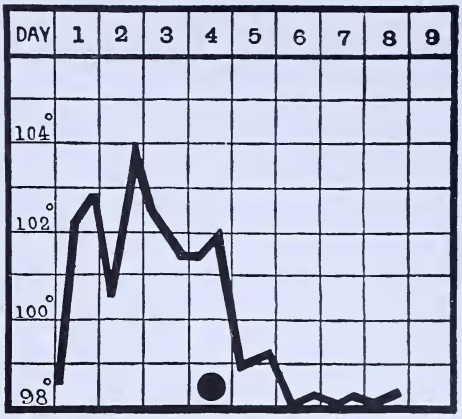
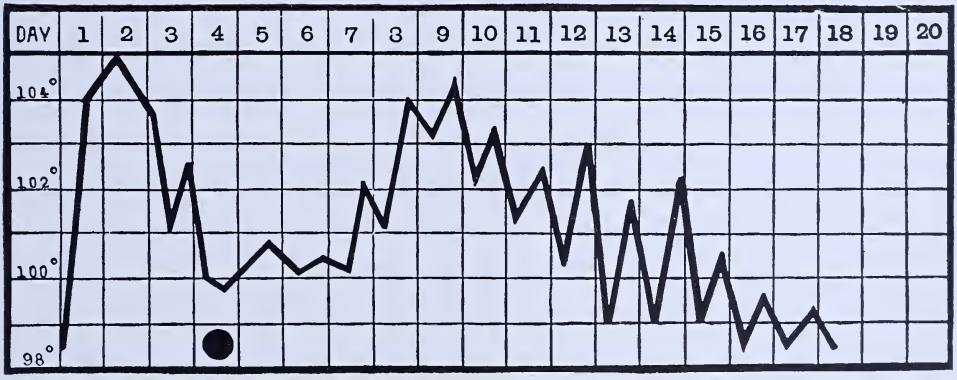
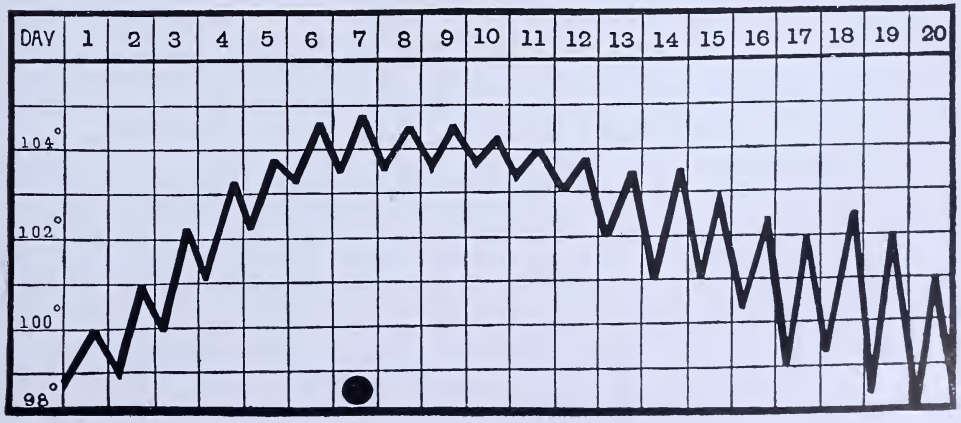


SMALL-POX



TYPHOID FEVER



low mutterings, and on coming out of sleep, but still delirious, fancies all kinds of strange things and thinks he sees objects and people about that are not actually present. Delirious patients should never be left alone for even the shortest while, as they may jump from the bed and out of window in a moment's time, or otherwise do themselves harm. Stay close by the delirious patient, agree with him in his hallucinations when occasion demands, soothe him by bathing forehead and other kindly attention and strive to gain and retain his confidence in every way, notwithstanding that for the time he is demented.

Great care must be given to diet, though for many days this will probably be chiefly milk or some prepared liquid food. During the time of actual fever the patient will be indifferent to food, but once the crisis is over and convalescence commenced there is apt to be such craving for food that the patient's appeals may become almost heart rending. Here the nurse must be gentle but firm. In typhoid, for instance, five to seven days should usually elapse before the patient be given any solid food whatever, and then the quantity which may be safely given will be so small as to simply aggravate the patient's desire. However, to vary from the strict and known rules will be certain to do the patient harm and may cause death. Be guided by instructions of attending physician and do not permit your kindheartedness to interfere with your known duty. Consult diet requirements of different fevers in the special articles on these fevers (see index at end of book).

Complications of various kinds are apt to arise in continued fevers, such as hyperstatic pneumonia (caused by too long continued lying in one position); pleurisy (outcome of slight cold or perhaps some undue strain on the part of the patient); hiccough (a dangerous, but not a frequent complication); and most commonly of all perforation of the intestines and from peritonitis. The safeguard against these dangers is constant vigilance and a knowledge of what to do at the first symptoms.

In all continued fevers and especially typhoid it is imperative that great care and attention be given to the actions of the bowels and kidneys. They must be kept free. Inactivity or constipation means that the outlets for poisonous matter are clogged and there is grave danger of serious complications. The exact times and natures of stools and of urine should be most carefully recorded and the physician's attention especially drawn to any and every condition that seems unusual or contrary to natural expectation.

Too much attention cannot be paid to cleanliness and to proper bath-

ing (see section regarding cleanliness). During the time of high fever it will be found of great advantage and will greatly reduce the fire of fever, to give frequent sponge baths with alcohol, some doctors recommending an alcohol sponge bath every hour during the higher stages of fever. Great care must be taken in giving sponge baths, either of alcohol or water, that the patient is not exposed to cold or draught and only such part should be uncovered as is for the immediate moment being sponged. A frequent change of well-aired linen and constant attention that the sheets are always smooth and the pillows comfortably arranged are also matters of needful care, and all these matters are essential even in the care of the lesser fevers.

Rest and quiet are necessary for the patient. He is not benefited and may be harmed by visitors. Even members of the family should keep away except where assisting in the care of the sick one. A trained nurse from without is generally very careful and insistent in this regard, but where one of the family is the nurse there is a danger of leniency as to other members of the family; but whoever the nurse, the rules in this as in other matters should be strictly enforced.

It is impossible in this chapter to lay down a complete set of rules as to what the nurse should do on all occasions. Other chapters of this work should be carefully studied and then the nurse do that which under the circumstances she is satisfied is best to do and not in opposition to the physician's orders or general instructions of this book. Remember that at any and all times emergencies may occur and quick wit, keen observation and positive coolness will be requisite, and the greater the knowledge of nursing and of disease and its treatment, so much more availing will be the nurse's aid.

NURSING OF SURGICAL CASES.

Serious surgical cases are to-day almost invariably a matter of hospital work where nurses especially trained for the requirements are at hand. Minor operations, however, are frequently performed at home, and occasionally it is necessary to perform a more serious one without removing the patient to hospital. It is therefore well to here give a general idea as to special requirements of the nurse in attendance.

In the first place we would recommend the careful reading of the chapter on Surgical Diseases, and of the instructions as to treatment of wounds in the chapter on Accidents and Emergencies.

The acquisition and continuance of disease is dependent upon germs, and the curing of disease upon the elimination of germs. A surgically clean wound—that is, one into which disease germs have not entered—will cure by what is known as first intention, or in other words, by nature. But if disease germs have entered the wound then, unless they be killed or driven out, complications will soon arise in the form of pus, decomposition, or gangrene and blood poisoning. Germs cannot enter the unbroken skin, but may enter where there has been the slightest cut or breaking of the skin. Therefore all wounds where the skin has been cut or broken must be kept free from infection. A little scratch on the finger which is left untreated and unguarded, will place a person in greater danger of blood poisoning than the amputation of an arm or leg where surgically clean instruments and dressings have been used. In bathing cuts or wounds, however slight, the basin or bowl in or from which the part is to be bathed must be first thoroughly scalded with boiling water and then only water which has been previously boiled and kept free from germs used in bathing, and to this water should be added a small quantity of carbolic acid, creolin or other germicide. Where no germicide at hand a spoonful of salt is the best substitute. All bandages must be antiseptic or surgically clean. Antiseptic gauze bandages can now be so cheaply purchased at all drug stores that there should always be a good supply on hand, but in their absence clean linen or cotton should be boiled, baked or soaked in an antiseptic solution before using. It is true that cuts and wounds are sometimes dressed with bandages that are not surgically clean, even with soiled handkerchiefs and dirty linen, and yet do not become infected, for even where disease germs exist they may be destroyed by the healthy cells and fluids of the blood and tissues, for these always endeavor to overcome the intruders, but there always exists grave danger that they may not be strong enough and that they may be themselves overcome by the disease germs even in the case of the previously most healthy person. Surgical cleanliness therefore cannot be too strongly insisted upon.

The sick room patient who is the subject of wound, whether from surgical operation or otherwise requires not only all the care of ordinary nursing, but attention to the wound, the care of which should be studied in the chapters of this work relating especially thereto. Consult Index at the end of this book and read the articles there indicated.

THE CHILD PATIENT.

In the chapter of this work especially devoted to the care of children there will be found full discussion of the ills of infancy and childhood and their treatment, but in the present chapter on the science of caring for the sick, it is well to draw attention to the fact that the child requires just as careful nursing as the adult and sometimes even greater care. The little child or infant cannot tell his wants, yet his needs are just as great as those of the grown man or woman. The little child in burning fever needs a cooling drink as well as the older patient. We have spoken of the need of rest and quiet for the fevered patient, yet how often it happens that no thought to quiet is given for the sick baby. Doors are slammed, people talk in loud voices and generally there is a carelessness as to the making of noise—yet if the baby face be watched, indication may be observed that show that the noise and tumult are causing pain. Especial care, too, should be given to the temperature of the room and to the covering of the child. It must be kept sufficiently warm, yet must not be unduly covered. Heavy coverings over a little child may cause incalculable harm in different ways—such heavy covering as to prevent free movement of the limbs, for instance, may tend to cause deformity. Water bottles with properly heated water (not too hot) encased in slip covers, placed about the infant and then light covering over the child are more to purpose than heavy clothing, and there should be plenty of fresh air. Give all the care to a child that you would to a grown person and give especial thought to its needs, of which it cannot tell.

THINGS TO BE AVOIDED.

Undue Talking.—It is not well to indulge the patient in talking too much, and especially is this true of the night. The patient becomes excited and passes a restless night. Have it understood that the night is for rest, both with the patient and the household. If this be firmly adhered to it will redound to the good of both patient and nurse.

Visitors.—In the vast majority of cases visitors are detrimental to the patient's welfare. They mean well, but they almost always more or less excite the patient, whose greatest need is quiet and rest. A restless night is apt to follow with undue rise of temperature. There are some visitors who are exceptions and who have a soothing, calming effect, but

it is better to exclude all visitors than to run any chances in this regard, and under no circumstances should a number of different visitors be permitted.

Too Many Flowers.—There is nothing more cheering in a sick room than a few pretty flowers, and there are very few patients who are unable to enjoy them, but unless great good sense be exercised by the nurse there is a danger of more harm than good. Lilies of the valley, violets, roses and almost all flowers have more or less heavy odor, which is apt to become nauseating. Flowers in a sick room should be confined to a few simple flowers kept in a vase within sight of the patient, but at some distance from him, the water in the vase should be fresh and no one set of flowers kept unduly long in the room. It is usually well to leave them but for a short time and then take them away, perhaps bringing them in again after a reasonable interval. When flowers are sent to a patient they should, when his condition permits, be taken to him for a brief time, and then removed. But it is often well to keep even knowledge of their receipt from the patient until he is convalescent, when the cards which accompanied the flowers may be shown and there will be real pleasure in knowing of the friends who had remembrance.

Disturbing Influences.—Keep the sick room quiet and restful. Keep out all news of exciting nature, business matters and everything which may disturb. Even trivial matters may cause anxiety or excitement.

Unclean Articles.—Soiled linen, glasses or utensils of any kind must be immediately removed. Nothing but what is absolutely necessary is to remain in the sick room.

Appearance of Being on Guard.—The nurse must ever be on guard—always watchful, yet avoid the appearance of it. A patient is apt to become nervous if he feels he is being constantly watched. It is well much of the time to place yourself where the patient cannot see you and knows you cannot see him, yet where you can hear the lowest call and where the slightest movement will attract you.

Actions that May Worry.—The nerves of sick people are very sensitive. Singing, humming, rocking a chair, rattling a paper—a hundred and one little things if kept up for any length of time are apt to "get on the patient's nerves," and perhaps become almost unbearable, although he may try unmurmuringly to put up with them and by his very trying bring on exhaustion or other ill. All the actions of a nurse should be of a quieting and restful nature and all about the sick room should conform to this idea.

Impatience and Ill Temper.—The nurse's position is a very trying one at many times and requires the greatest patience. It may be almost impossible at times to retain one's good temper, yet remember that the slightest exhibition of ill temper or impatience may have serious effect upon the patient's condition. Retain your dignity and no matter what occurs be pleasant, sympathetic and resourceful, yet forceful and unswerving in your duty, and through it all bring a love and kindness to bear that will bring contentment to your patient. That the patient both like and respect the nurse are important factors in his progress toward recovery.

MASSAGE.

Massage is a method of treating certain conditions by scientific manipulation of muscles, nerves and blood vessels by means of systematic rubbing. It is a study by itself and it requires much practice to become properly efficient. It has been the subject of much controversy and has been so abused by unscrupulous impostors that with many there has grown up a prejudice against it. Notwithstanding this, the best physicians of the world recognize it as of vast benefit to many patients, and so it is mentioned in this article on nursing. But as it is a subject requiring special study and instruction, we would refer the nurse to a special chapter on this subject. When the physician advises massage for a sick room patient he generally advises the engagement of some one whom he names as proficient in the art, or he may give instructions to the nurse as to the way to massage the particular part he desires should be so treated. Frequently trained nurses have given special study to massage and are capable of executing any orders the physician may give in such regard.

DIET FOR THE SICK.

Service of Food.—There should be a special set of dishes for the patient's exclusive use. In contagious diseases this is imperative. The daintier and more attractive these dishes can be the better. Sick people are very sensitive to little things and a coarse dish or one that is chipped or cracked may take away the relish of a meal. The tray should be covever with a clean white traycloth, all linen should be immaculate, fresh napkins should be given at every meal if they show any soils, china must be spotless, glasses polished and silver shining. No dish should be so full that it may spill or slop over in carrying, moreover, the appearance of

much food often destroys appetite. Food that is intended to be hot should be served hot, and that which is intended to be cold should be served cold. Seasoning is an important detail. High seasoning is not to be recommended, but in so far as possible the likings of the patient should be considered. All food must be fresh. Great care must be taken in regard to such articles as eggs, if there is not the most absolute surety as to their freshness they must be opened before entering the sick room. Milk and cream must be sweet and should be tested before each serving. Do not serve any article about which there is one particle of doubt. Never taste foods in the sick room. That should be done outside and anything wrong corrected before the food comes to the patient.

Selecting Foods.—One of the important matters connected with nursing is the question of nourishment for the patient. While in most cases the physician will give directions in general as to the feeding, it will often devolve on the nurse to make selection for the patient of what she considers suitable, and not infrequently she will find it necessary to prepare the food herself. She must decide what combinations are appropriate, and what variety must be introduced, and when the patient tires of one food she must exercise her ingenuity often to the utmost to find a substitute. Food which is suitable in the morning, or at noon, is often improper to give at night, and what will agree under some circumstances will manifestly, under other conditions, be wholly inadmissible. As a usual thing it is better not to consult the patient about what his meal is to be, for if he is asked what he would like he will in all probability say that he would rather have nothing, and if told beforehand what he is to have, even if he has been wanting it, he will be apt to lose his desire for it.

The Patient Not to Judge.—Moreover a patient's inclinations are often not a safe guide, for he will be as likely as not to choose some article of diet altogether unsuitable. For instance, in convalescence from typhoid fever it is quite essential to exercise the utmost care in the matter of food for a considerable period of time, the ordinary diet being resumed only very gradually and tentatively, lest irritation and consequent relapse occur. But it is almost invariably the case that long before it would be permissible the patient has a strong desire for solid food, often of the kind which would not be proper, and an inordinate appetite, which, to gratify, would inevitably be detrimental.

How the Nurse Should Judge.—Accordingly it is better to ascertain quietly and gradually the likes and dislikes of a patient, and what ordi-

narily agrees with him best, and with this knowledge to use one's judgment as to what to provide.

There are certain articles of diet, however, which are pre-eminently suitable for the sick, some under one set of circumstances, some under another. Among these are:

Milk.—The bland, unirritating nature of milk and the fact that it furnishes all the elements necessary to sustain life make it ordinarily a suitable article of diet for the sick, and unless contra-indicated it is quite usual to have it form the basis for the construction of a dietary, and for it to enter largely into the composition of the food selected. It is not infrequent indeed that it is used alone for many weeks at a time.

Administration of Milk.—If the taste is objectionable to the patient it may be disguised by flavoring with coffee or caramel. By feeding through a tube or straw the action of the saliva is secured, and by giving it slowly the formation of large curds, impenetrable by the gastric juice, is prevented. To counteract the tendency to biliousness, which occurs in may people from its use, it is customary to add a small pinch of bicarbonate of soda, or from a third to a half of lime water, soda water, apollinaris or vichy. At times it is more easily digested if boiled or scalded and diluted; in diarrhœa boiled milk often has a salutary effect.

Steady Milk Diet.—An exclusive milk diet is often resorted to in cases of heart, kidney and stomach diseases, and under these circumstances it is generally first skimmed. Dr. Thomas G. Morton is accustomed to having it administered every hour and a half from 7 A. M. to 10 P. M., beginning with three ounces or six tablespoonfuls, and increasing the amount one-half ounce with each dose until from two to six quarts are taken daily. This diet is continued for a month or six weeks, when a few easily digested articles are allowed, and a suitable dietary is gradually constructed. On a milk diet the patient at first feels weak, and soon develops a disgust for the milk, but this is usually overcome before a great while, and a desire is often established for a continuance of the milk even after convalescence. It is usually necessary to administer suitable laxatives to overcome the constipation which the milk causes.

Whey.—This is a watery, somewhat turbid liquid resulting from the removal of the curd of milk after coagulation. It contains a fair proportion of the nutritive constituents of the milk, which may be increased by expressing as much of the fluid from the curd as possible. Sometimes it is used as a vehicle for the administration of other nutriment, as beef juice, yolk of egg, etc.

Preparation of Whey.—Whey may be prepared in several ways. To a pint of lukewarm whole milk is added a teaspoonful of essence of pepsin, or of liquid rennet, and stirred only long enough to mix. After cooling and coagulation, the product is stirred with a fork, and the whey strained off. Or to a pint of boiling bilk add two teaspoonfuls of lemon juice and strain. Wine whey is made by bringing to the boiling point a pint of milk and adding two wineglassfuls of sherry wine. As it boils up again remove from the fire and strain.

Junket.—Make the same as the first formula for whey, with essence of pepsin or liquid rennet, but do not stir. Eat with sugar and cream. If desired, flavor with a little nutmeg and extract of vanilla. Tablets are furnished in the stores for the sake of convenience for making junket.

Buttermilk.—Fresh buttermilk can be used in many cases where milk disagrees, largely because of the formation of finely subdivided curds.

Koumiss.—For the same reason koumiss is often valuable under similar circumstances. Containing as it does carbonic acid gas it is grateful to the irritable stomach, while the small amount of alcohol present furnishes slight stimulation. To prepare it take an eighth of a cake of Fleishman's compressed yeast—fresh—and a tablespoonful of white sugar. Dissolve in a little warm water. Pour into a quart champagne bottle and fill to the base of the neck with fresh milk. Tie cork securely, lay on its side in a cool but not cold place for two or three days, shaking occasionally. If it is desired to hasten the process of fermentation, it may be kept for twelve hours at a temperature of about 70 degrees, although the slower method makes a smoother and pleasanter preparation. A champagne tap must be used to draw it off. Some prefer it when two days old, others when it is somewhat more acid in taste, at the age of three days. Kefyr and matzoon are similar to it.

Peptonized Milk.—To a pint of lukewarm milk diluted with one-fourth its bulk of water add fifteen grains of bicarbonate of soda and five grains of Fairchild's Extract of Pancreas. Keep in a warm place for twenty minutes. Then place against the ice to check further peptonization. This milk is partially predigested and can often be taken when milk cannot.

Sterilized Milk.—To sterilize milk without a special apparatus for the purpose it should be placed in infants' nursing bottles, which should be lightly corked with absorbent cotton. These should be placed in a kettle of cold water, with their bases kept from the bottom of the kettle by a folded towel or other contrivance. The water should be boiled for twenty

minutes, the cotton removed and replaced by tightly-fitting corks and the bottles be allowed to cool gradually. Strictly speaking, milk thus prepared is "Pasteurized," the process of sterilization being simply a prolongation of this, for about twice the length of time. Pasteurized milk is more easily digested than sterilized milk. Both are used for feeding invalids and especially infants.

Modified Milk.—This is a combination of milk, cream, water, lime-water and sugar of milk in such proportions as the age and strength of the infant for which it is prescribed seem to indicate. A useful and convenient way to employ this for home use is by means of the "materna" apparatus, which is a graduated glass presenting eight panels, each one being marked in such a way as to show how much of a particular constituent of the modified milk is to be used for a specified age.

There are also combinations of milk with other articles which will be considered among the miscellaneous formulæ given later on.

Animal Broths.—These often form a suitable means of giving nourishment to the sick. Unless prepared with great care they do not contain the amount of nutrition for which they ordinarily receive credit, for if too high a heat is used the albuminous principles are coagulated and the virtues of the preparation decreased.

Beef Essence.—A piece of lean, juicy beef is minced and placed in a wide-mouthed jar, which is tightly corked and set in a kettle of cold water. This is then allowed to boil moderately for three or four hours, when the essence is expressed and seasoned. A tablespoonful may be given every two hours.

Beef Tea.—Cut in small pieces a pound of lean, juicy beef. Cover with cold water for an hour or more. Simmer gently for three hours at a temperature not above 160 degrees; strain and season. The finished product shoud measure one pint; if less, sufficient water may be added to equal that amount.

Beef Juice.—Pieces of lean, juicy beef the size of a walnut are toasted for a moment over a hot fire and the juice expressed by means of a lemon squeezer or a specially-designed press. Season with salt and give a tablespoonful every two hours either warm or mixed with pounded ice.

Scraped Beef.—Lean, raw meat is scraped fine and the pulp pressed through a coarse sieve. This may advantageously be added to the beef tea or beef essence.

Mutton Broth.—Add two quarts of cold water to two pounds of lean mutton; boil very gently for two hours and season. A little barley or rice

may be added. The broth should be allowed to cool and all the fat skimmed off.

Chicken Broth.—A chicken, or, if large, a half chicken, after being skinned and cut up, is boiled gently in a quart of water for an hour, seasoned and strained through a colander.

In cases where solid nourishment is permissible the following kinds of animal food are suitable:

Beef Steak.—A piece of thick, lean sirloin or tenderloin steak should be broiled quickly over a clear coal fire, the exterior only being cooked, while the interior is kept rare and juicy.

Lamb Chops.—Lean rib or loin chops are suitable. They should be broiled until well done.

Chicken.—Tender chicken, carefully broiled, is a suitable food for the sick.

Squab.—Young pigeon or squab, broiled, is considered a delicacy and is nutritious and appetizing.

Sweet Breads.—In some cases these may be eaten and are highly appreciated. They should be parboiled and then carefully broiled, with a little butter rubbed over the surface.

Oysters.—When in season oysters taken raw are nourishing and easily digested. Cooked they are less digestible, though permissible in some cases.

Oyster Broth.—Slowly simmer for ten minutes a pint of oysters in a half pint each of water and milk; season to taste and strain.

Clam Broth.—Equal quantities of clam juice and boiling water are seasoned with salt. Clam juice and clam broth are often retained in great irritability of the stomach.

Eggs.—Beaten light these are most digestible. One of the most frequent ways of giving them is in the form of eggnog.

Eggnog.—The white and yolk of an egg are beaten separately, very light; they are now stirred together, sweetened and salted, and to these are added a small amount of brandy, sherry or port wine, a little nutmeg and an ounce of milk.

Boiled Eggs.—Cooked eggs should be soft, as the albumen or white is otherwise hard and indigestible. Boiled for three and a half minutes or less they are, however, suitable. It is still better to put them into boiling water, remove them from the stove and allow them to stand in the hot water for seven minutes.

Powdered Yolk.—If eggs are boiled for an hour or more and cooled

the yolks may be mashed into powder, which, with a little salt, is agreeable, nourishing and digestible. It may be taken plain or mixed with milk, whey or broth.

Egg Water.—In cases of extreme gastro-intestinal irritability the whites of two eggs stirred into a half pint of cold water, and sweetened or salted, may be given as a drink.

Vegetable Sick Foods.—Pre-eminent among the vegetable forms of aliment are the cereals, which in recent years have been so largely popularized by the introduction of scores of palatable, nutritious and digestible preparations. Many of these are already cooked, while others are predigested as well, so that they require little time or trouble in serving. A judicious selection from among these affords variety in taste and composition.

Wheat Foods.—These take the lead in nitrogenous constituents, followed closely by rye, barley, oats and corn; oats, corn and barley are richest in fats; rice contains chiefly starch; while oats contain the greatest amount of indigestible cellulose. This, however, in the finer preparations is largely removed. Of the wheat preparations, the following may be mentioned, rolled, cracked, crushed and granulated wheat, called by many names, according to where or by whom it is prepared, vitos, wheat germs, germea, wheatlet, wheatena, cream of wheat, shredded wheat, and so forth. Gluten flour is supplied for the use of diabetics and those who cannot well take starch; and farina, a material similar to cornstarch, for the use by itself or in combination with other substances.

From the other cereals similar preparations to those made from wheat are manufactured.

Following are the formulæ for preparing some of the foods in common use for the nourishment of the sick:

Milk Toast.—Remove the crust from two small slices of baker's bread, a day or two old; toast carefully, and cover with a half pint of scalded milk previously salted.

Boston Cream Toast.—Prepare as above, but thicken milk with a heaping teaspoonful of flour mixed with the same amount of butter; these are to be carefully stirred into the hot milk and brought to boil.

Toast Water.—Cover well toasted, not burned, bread, with boiling water; set aside till cool, strain and salt or sweeten to taste.

Panada.—Cover split crackers or slices of toast with boiling water, previously sprinkled with sugar, salt and, if desired, a little nutmeg. Simmer gently until the product is like jelly. Serve while warm.

Flour Gruel.—Mix a tablespoonful of flour with enough milk to make a smooth paste; add a quart of boiling milk; boil for a half hour in a double boiler; salt.

Flour Ball.—Make a ball of a pint of flour which has been moistened with four tablespoonfuls of water; tie tightly in a cloth; dampen the outside of the cloth and sprinkle with flour; boil hard for ten hours. Remove the cloth and dry the ball for ten hours in an oven. Grate two teaspoonfuls of flour from the ball, mix into a paste with cold water and stir into a cup of boiling milk.

Farina Gruel.—Stir two tablespoonfuls of farina into a quart of water; boil until thick; add a pint of milk, salt and boil fifteen minutes longer. Serve with sugar and cream.

Arrow-Root Gruel.—Mix into a paste two teaspoonfuls of arrow-root with a little water; stir into a pint of boiling water or milk. Sweeten and boil for three minutes.

Oatmeal Gruel.—Boil two tablespoonfuls of oatmeal in a pint of water until smooth. Salt and strain.

Wine Jelly.—Pour two ounces of cold water on one-half ounce of granulated gelatine, and six ounces of sugar. Soak for fifteen minutes and stir into ten ounces of boiling water until dissolved. Add four ounces of sherry wine, strain through a jelly bag or coarse toweling and cool.

Iceland or Irish-Moss Jelly.—Thoroughly wash a handful of the moss and soak for one hour in a very little water. Stir into a quart of boiling water and simmer until it is dissolved. Sweeten and flavor, strain and cool. Serve with cream.

Flaxseed Tea.—Pour a quart of boiling water onto four tablespoonfuls of whole flaxseed and steep for three or four hours. The juice of two lemons may be added, and sugar if desired.

Barley Water.—Wash two ounces of barley; boil for five minutes and pour off the water. Add two quarts of water and boil down to a quart. Salt or sugar may be added. This is often employed to dilute milk.

Puree of Celery.—Cut into small pieces enough of the stalks of celery to fill a pint measure. Stew in a quart of water until tender. Salt, thicken with a little arrow-root and add a cup of milk. Boil for two or three minutes, stirring constantly.

Puree of Asparagus.—Proceed as for puree of celery, reserving the tips and discarding the stalks, after they are cooked.

Puree of Tapioca.—To a half pint of boiling water or milk, gradually

stir in a tablespoonful of instanteous tapioca. Add salt, and boil, with constant stirring until it begins to thicken.

Milk and Albumen.—Shake in a bottle for five minutes the whites of two eggs and two ounces of lime-water; add a pint of milk, sugar and sherry wine to taste, and shake five minutes more. Give a wineglassful every two hours.

Cocoa.—Dissolve a teaspoonful of Phillip's Digestible Cocoa in a little cold milk. Add to this a coffee cupful of hot milk.

Predigested Foods.—Attention has already been directed to the peptonizing of milk; the same process may be applied to gruels made from oatmeal, or other cereals, and to beef tea, thus artificially digesting them before they are taken. Peptonized meat preparations have the disadvantage of a disagreeable odor and taste, but they are highly nutritious.

Extracts of Malt.—These are also employed in predigesting cereals, Maltine, diastoid, diastase and extract of malt are some of the preparations which may be used in this connection. One of the successful applications of modern pharmaceutical skill is that exhibited in the manufacture of these artificially digested foods, many of which supply in concentrated form ready for absorption and assimilation the most important elements of nutrition.

PREVENTING THE SPREAD OF CONTAGIOUS DISEASES.

Diphtheria, scarlet fever, measles, typhoid fever, typhus fever, yellow fever, chicken-pox, small-pox, syphilis, cholera, erysipelas and mumps are the diseases which are usually recognized as being contagious, or capable of being transmitted from one person to another, either directly or indirectly, and to these may be added consumption in the sense that the expectorations of the consumptive are permitted to dry and become dust, such dust may communicate consumption to those who inhale it. It would be well to include epidemic influenza or "the grippe" in the list. On the occurrence of any of these diseases special care should be taken to prevent their spread. Select a room at the top of the house that is capable of the most perfect ventilation. There should be no carpets and nothing but the simplest and absolutely essential furniture. The room should be thoroughly cleaned before the patient enters and once he is placed in the room all others of the household excepting the nurse should be kept out. The nurse should have as little communication with the household as possible; her meals and everything to supply her needs and those of the

patient should be placed on a table outside the door. The door should be kept closed, and a sheet kept constantly wet with disinfectant should be hung over the doorway outside.

Contagious Diseases, Disinfection of.—This is a matter of vital importance. When inefficiently done it is a source of great danger in that it gives a false sense of safety. The purpose of course is to destroy germs. While occupied by the patient the most efficacious disinfectants for the sick room are fresh air and scrupulous cleanliness. In the matter of infected articles, such things as scraps of food and everything else that it is not necessary to keep should be immediately burned, while other things should be thoroughly disinfected by boiling for one hour in water. The disinfection may be made more rapid by the addition of a little washing soda to the water. Articles which for any reason cannot be boiled, and which are not greasy, may be disinfected by soaking for an hour in a solution made by dissolving three ounces of pure (not crude) carbolic acid in a gallon of water. In removing bedclothing, underclothing, handkerchiefs, etc., from the sick room they should be put in a soiled clothes bag, pillow case or sheet which has been previously soaked in the carbolic acid solution. Then without handling they should be dumped altogether into boiling water and boiled for an hour. They may then be washed in the ordinary way. Knives, forks, spoons and dishes should be washed with the carbolic solution and boiled half an hour. All discharges from the patient, including those from the mouth and nose, should either be destroyed by fire or subjected at once to the carbolic acid solution or other disinfectant. With consumptives, expectoration should be made into pasteboard boxes, which must be burned before the expectorations become dry. Bedpans and like utensils should be washed with the carbolic solution, and some of it left in the utensil.

Waterclosets, drains, cesspools, sewers, cellars, privies, yards and stables may be disinfected by a free use of chloride of lime, which should be used every day.

The New York City Board of Health prescribes the following rules for disinfecting a room after removal of a patient who has had a contagious disease:

"All cracks and crevices in room to be disinfected must be sealed or calked to prevent the escape of the gases and one of the following disinfectants used for the room disinfection in the quantities named:

"Sulphur, 4 pounds for every 1,000 cubic feet of air; eight hours' exposure.

"Formalin, six ounces for every 1,000 cubic feet of air space; four hours' exposure.

"Paraform, 1,000 grains for every 1,000 cubic feet of air space; six hours' exposure.

"The following disinfecting solutions may be used for goods which are afterward to be washed:

"Carbolic acid, 2 to 5 per cent.

"Bichloride of mercury, 1-1,000. (This, however, causes a permanent discoloration.)

"After disinfection of rooms, the carpets, rugs, mattresses, pillows, etc., must be removed by the Department for disinfection by steam, and the rooms should then be thoroughly aired and cleaned with soap and water."

Sulphur and paraform candles may be purchased at any drug store.

Blankets, bedding, clothes and other articles must be exposed to the fumes, and should be so hung as to be loose and free for circulation of the fumes. All closed doors, bureau drawers and the like must be open during fumigation.

After disinfection the room should be most thoroughly cleared, washing everything possible with hot soap and water or some standard disinfectant, and this should be followed by repainting and repapering or whitewashing.

CONVALESCENCE.

The care of the convalescent comes within the knowledge which all nurses should have, and is so important that we here follow with a special chapter devoted to the subject.

SPECIAL DIETS FOR THE SICK ROOM.

As this is matter of great importance a special chapter is devoted to the subject and immediately follows that on Convalescence.

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THE SICK ROOM IN THE HOME

PART II.

CARE DURING CONVALESCENCE.

Definition.—The word convalescence is derived from the Latin *convalescere,* meaning "to grow strong." It is the period of recovery after disease, the state midway between the final cessation of the disease and complete restoration to health. Although it is applicable to the periods of improvement in the course of chronic ailments, yet it is generally used in connection with the acute or self-limited diseases.

Importance of Obedience.—Since convalescence is the termination to which proper treatment, nursing and strict obedience to all the instructions contained thus far in this volume would naturally lead, except in cases of chronic, incurable diseases and old age, for which no cure has as yet been discovered, it may appropriately conclude the sections on preventive and curative medicine—substantiating the *prognosis,* or the predictions as previously set forth.

CAUSE.

Overbalancing Disease.—When disease fastens itself upon the human organism the outcome or result depends entirely upon the resisting power of the different tissues and organs. If tolerance is maintained and the several functions are not arrested, the diseases will be overbalanced by the vitality and resisting power of the body.

Failure of Response.—But if the different tissues and organs do not respond to the increased tax made upon them; if they grow progressively weaker, the disease will constantly find additional means of spreading and ultimately the forces of the body are arrested and death ensues.

The Causation.—The causation of convalescence is, therefore, the response of living tissue to injury, the rallying of the vital forces, which overpower the disease and its primary cause, whether it be due to the countless micro-organisms, to neglect, exposure, or the many unknown factors.

Sign of Convalescence.—Just how convalescence is established we do not know, just how or when the resistance first exerts itself is a mystery, yet that it is a fact is evident, for in some diseases convalescence can be noticed almost from the moment it begins.

Termination by Lysis.—In certain diseases there is resolution by gradual subsidence, the fever growing less and less each day, until normal temperature is reached; while the strength increases and the faculties brighten. After the fever has entirely subsided the improvement is much faster and convalescence is rapid, although very often a long time is required to bring the patient back to his usual health. This is called *termination by lysis.*

Termination by Crisis.—In other affections, as pneumonia, the turning point to health is pronounced and plainly evident. Very often the change can be noticed inside of a very few moments, and within twenty-four hours convalescence is established; recovery following rapidly. This is styled *termination by crisis.*

Recuperative Force.—But in both cases the termination is due to the recuperative power being stronger and more vigorous than the cause of the disease—and it is therefore simply a question of the stronger overcoming the weaker.

Recovery in Certain Diseases.—As will be seen further on, under the paragraphs dealing with the convalescence of the special affections, there are many diseases which run a certain, definite course, both as to length, severity and convalescence. In these diseases, one familiar with the science of medicine can form a very accurate opinion as to the initiation of recovery, and foretell with a fair degree of accuracy the duration of the convalescence. This information is gained by comparing the records and statistics of many thousands of cases, using the average as a basis and applying the particular patient's symptoms and conditions with it.

SYMPTOMS OF CONVALESCENCE.

Convalescence presents some very different characters according as it succeeds to acute or chronic affections—in the former case it is clearly defined and noticeable, even to a superficial observer.

Its Commencement.—This is often marked by critical phenomena, and always by the cessation of local pain or general symptoms of the disease. To the patient himself it announces its welcome advent by a feeling of ease and comfort previously longed for in vain; whilst to the physician

it makes itself known by reliable characteristics—such as a natural and peaceful expression of the countenance, vivacity and clearness of the glance, susceptibility, and, as it were, curiosity of the senses, an agreeable change in the disposition, and a tendency to gayety, a prolonged and refreshing sleep and a greater mobility of the circulation.

The Encouraging Signs.—These do not all make their appearance simultaneously, but generally follow each other in groups at short intervals, often merging together.

Almost always the first phenomena of returning health develop themselves amidst the fading evidences of illness, but occasionally we observe in individuals of vigorous constitution transitions from disease to convalescence occur with marvelous rapidity.

Recovery in Chronic Cases.—In recovery from chronic maladies the physician is not often called upon to assist at such kaleidoscopic changes from disease to health. The functions of the organism do not re-establish themselves with the same promptitude, nor in the same almost simultaneous manner. They become regulated, as it were, one by one, in consequence of careful and individual attention, and even when restored to their physiological type they are wanting for a long time in force and endurance.

After Chronic Illness.—The loss of adipose is often not repaired until after months or even years of convalescence, and the countenance frequently retains for a great while the imprint of the sufferings which have been endured, while after the acute diseases, such as the fevers, the acquirement of flesh is usually rapid, often increasing the weight above the normal limit.

Hunger.—If we consider the symptoms of convalescence a little more closely we will find that hunger is one of the first and most important manifestations of returning health after an acute disease. The appetite for food is sharp, and renews itself after a very brief period; sometimes it is even voracious.

Eating becomes in many cases the great, perhaps the sole, aim of the convalescent; and when he happens to be of an age when growth is not yet terminated, and when, consequently, assimilation is normally active, he is apt to seek the gratification of this voracity with arguments and supplications which render it very difficult for the physician or nurse to enforce a proper regulation of the diet.

In military hospitals it is often necessary to resist the tears and most

vehement prayers of convalescents in order to preserve them from dangerous and fatal consequences of their own excesses.

Heart and Circulation.—As hunger is the demand on the part of the attenuated tissues for more nourishment, so is the strengthened circulation due to the need of the body for more oxygen and less carbonic acid gas.

Circulation in Convalescence.—During convalescence the circulation presents a singular impressionability—the pulse is often slower than in health, falling sometimes as low as forty, or even thirty-five beats per minute; but it is very excitable and is accelerated by the slightest cause. The simple act of changing the position or attitude will increase its rate greatly, while the approach of a stranger, especially the physician, the slightest worry or mental excitement, will at once increase the pulse rate.

Pallor and Flushing.—The increased mobility or the circulation gives rise to ultimate pallor and flushing of the face upon the slightest cause. A delicate softening of the skin and transient perspiration are also due to the easily-influenced circulation and the low muscular power.

The Pallor.—The pallor of convalescence arises, not by the emptiness of the blood-vessels, as was formerly believed, but from the diminution in the quantity of red blood corpuscles; in consequence of the prolonged abstinence from the proper amount of food or its malassimilation.

Blood Corpuscles.—This diminution is determined by the ingenious hæmatimeter of Hayem and Nachet, by which the number of corpuscles in a given amount of blood are counted—from which it is easy to compute the percentage in the entire arterial system. A cubic millimeter of normal blood contains about five million red blood corpuscles, yet in convalescence we often find as low as two million corpuscles in the same quantity.

Red Blood Corpuscles.—These are the carriers of oxygen to the different organs and tissues of the body; consequently when we find the carrying power so greatly diminished we can readily understand the many symptoms of an impoverished circulation. One of the best examples seen of this is in the excessive sensitiveness to cold due to lessened oxidation. Again we find vertigo and dizziness due to anemia or imperfect blood supply of the brain, and palpitation of the heart.

Respiration is not affected during repose and quietude, but slight muscular effort causes fatigue and shortness of breath; this is especially

noticeable after ascending a short staircase, and is caused by impoverished blood, together with some slight febrile action.

Need of Oxygen.—For as muscular activity is destructive to the body it is necessary that carbonic acid gas ($C\ O_2$), the product of such destruction, be carried away, and that oxygen be returned to the tissues in order that they may recover from the loss. The convalescent's blood is not as able to perfectly carry out this function as the blood of a healthy individual, hence the lungs are required to put forth extra respiratory efforts, and shortness of breath results.

Digestion.—Constipation is the rule rather than the exception in convalescence, and is due to the enforced quietude, the diminished secretions from fever, the febrile reaction and the lessened food supply. The tongue which has been coated, or hard and baked, as the case may be, gradually clears off becoming soft and moist as the bowels are regulated. And disturbance of the stomach, as nausea and vomiting, discomfort after eating, and so forth, ceases under proper diet, and the extreme thirst disappears. The digestive symptoms will be mentioned more fully further on, under the special diseases.

Urine.—The urine during convalescence becomes more abundant (usually from forty to fifty ounces in twenty-four hours) and less fully charged with uric acid than in health. It ceases to present the dense, high-colored and strongly odorous character met with in disease, and if it has contained albumen or sugar this will disappear, unless the acute disease has developed into a chronic one.

If, during the course of the disease, there has been an involuntary voidance of the urine, the desire to urinate frequently and the inability to perfectly control the urine will be felt for some time during convalescence. This, however, will return to normal as the patient regains health and strength.

Sexual Powers.—In females the menstrual discharges are re-established during convalescence, and in many cases the genital organs show marked activity—married women becoming pregnant soon after convalescence. In the male convalescing from acute diseases, there is generally an energetic stimulation of the sexual functions. After convalescence from chronic diseases, middle-aged patients frequently suffer a loss of sexual appetite and emotions. Cases of sexual weakness, discharges, and so forth, following acute diseases, are generally transient and leave no untoward effects.

Skin and Hair.—The outer layer of the skin, or the epidermis, the

hair and the eyebrows, are frequently shed during convalescence; but this loss is as a rule only temporary.

Muscles.—The muscles after sickness are more or less emaciated and flabby; this varies greatly after different diseases; some acute diseases causing a very rapid loss of flesh, while others are more like chronic ailments, in that the emaciation is slow and progressive. The muscles of the abdomen are usually soft and flabby, while the long muscles of the legs and arms lose their firmness and are easily separated one from another. The muscular tissue of the several organs are also affected, being unfiltrated with fat, decidedly inactive and subject to tissue change.

Muscular Movement.—Muscular movement, for a long time, fails in that energy and precision which marks a state of complete health, and all the organs display an inability to react against, or to withstand, any of the innumerable outside influences with which mankind is surrounded, as they would normally do.

Sleep.—The sleep of convalescence is sound and refreshing, losing the disturbed character which it had during illness and becoming calm and tranquil. As there is perfect rest, both physically and mentally, during normal slumber, the convalescent should be allowed a large portion of the day in which to sleep undisturbed.

Mental Powers.—The mental powers, both of perception and reasoning, gradually return during convalescence, but for a long time patients have little endurance, becoming easily fatigued and exhausted after mental exercise. After a severe, acute malady, such as typhoid fever, the intellectual faculties are often very slow in returning to their original integrity, and months or even years may elapse before the patient enjoys his full mental vigor.

Mental Disturbance in Childhood.—In certain acute diseases peculiar to childhood, such as scarlet fever, meningitis and diphtheria, there is often mental disturbance, and while it takes a long time before the mind recovers its normal state, yet in such cases the outlook is generally favorable.

Loss of Mental Power in Adults.—In adult patients who are convalescing from nervous disorders, the loss of mental power is serious, and the full vigor of the mind is seldom acquired.

Convalescence of Old People.—In elderly people, a convalescence often hastens the physiological loss of mental power—the loss being especially appreciable to themselves and their associates, inasmuch, as it is sudden, instead of coming on gradually with each succeeding year.

COMPLICATIONS OF CONVALESCENCE.

How frequently we hear that a certain patient has "had a relapse." Yet in the majority of cases, such a relapse is due to some neglect or carelessness; and to impress upon the reader the danger of complication during convalescence, we take up a few of the most common points in connection with it. First, we will consider the causes which can be averted in most instances. They are improper feeding, exposure, over-exertion.

Improper Feeding.—If the desire for food returns slowly and is capricious in its choice for articles for diet; if the patient is quickly disgusted and wishes to change his bill of fare daily; if, in eating, he does not experience the pleasure which accompanies the satisfaction of a real want of the organism, and if, during digestion, acid eructations, flatulence, flushing of the face and distinct febrile movement occur, convalescence is not yet sufficiently advanced to permit gratification of the appetite and diarrhœa is apt to supervene on such indulgence. Should it do so, whatever progress toward health has been made by the organism is often more than obliterated.

The Complications which must be watched for in connection with the diet are, diarrhœa, vomiting or nausea, acid eructations, belching of wind, flushing of the face and fever. When any one of these symptoms are noticed, look to the food and see if a reason cannot be found.

Exposure due to cold draughts, cold moist air, an over-heated or ill-ventilated room, poor sanitary conditions, may complicate the disease. A patient convalescing from typhoid fever may contract bronchitis or pneumonia from atmospheric exposure, and in his weakened condition the result is to be feared. A pneumonia may be complicated by typhoid fever due to defective sanitation, filthy bed-linen or sick-room vessels. These are most important details which must not be overlooked, as proper attendance to hygiene and dietetics is the sheet-anchor during convalescence.

Over-Exertion.—A heart weakened by disease is not calculated to withstand the sudden demands made upon it by severe exercise. An intestine just healing after ulceration is not prepared to undergo the straining efforts made at stools while in the erect posture.

Gradual Exercise.—Consequently in allowing a convalescent to exercise it must always be remembered just how weak all the organs are, especially the one which has been the main seat of disease. It is better to keep a patient quiet in bed, in spite of his protestations, than to allow him

to over-exert. Moderate exercise, gradually increased, will be just as acceptable, and the termination is certainly more certain by success. The length of time that a patient must be kept in bed after sickness varies with the disease, its length and intensity. But generally speaking, a patient should not be allowed to get up until the fever and all other symptoms have been absent for at least ten days, and then the periods of exercise should be gradually increased as strength is regained.

Complications in Convalescence.—Certain diseases have a particular disposition toward complication during the convalescent period—while such conditions cannot always be prevented, they can at least be expected and preparation made to combat them. In the convalescence of diphtheria, for instance, one must constantly be watchful of any nervous symptoms which may arise; paralysis of different portions of the body, especially of the heart, is a very common complication and should be treated energetically. Scarlet fever is often complicated by acute Bright's disease, heart affections and disease of the middle ear. Pneumonia or influenza may insidiously lead into consumption, unnoticed, except for constant watchfulness. In fact, during convalescence, the patient should be kept under the closest supervision; the smallest details must be noticed and acted upon immediately. By so doing many secondary diseases, both chronic and acute, may be aborted in their infancy.

TREATMENT OF CONVALESCENCE.

When a malady is terminated, sanitary science, which had previously labored in conjunction with therapeutics to extinguish the morbid tendency, resumes sole charge of the patient and directs the convalescence, during which the individual, although no longer sick, is not yet in a state of perfect health. In convalescence the functions, although brought to an equilibrium, are still wanting in energy and in stability; the entire organism, more or less shaken by the attacks to which it has been subjected, re-establishes slowly, and, as it were, step by step, in its connections and its reactions with the external world.

Hygiene being the pre-eminently powerful agent in the management of convalescence the following sanitary rules are worthy of particular attention.

Protective Treatment.—The convalescent should be protected with special care against variations in temperature, from the baneful influence of cold air, of currents of air and from the effects of moisture. In the

condition of his system he is particularly apt to be affected by these agents, which may readily bring on a relapse, or some more or less serious complication.

Ventilation.—What has just been said does not mean that the patient is to be denied plenty of pure air; for as we have shown in preceding paragraphs, oxygen is as much a necessity to the human economy as is food. A patient should be allowed at least 1,500 cubic feet of air space and the air should be changed once in every two hours. To do this requires some ingenuity if the sick room is not supplied with special ventilating apparatus—for the first air should be warm and dry.

A Simple and Effective Method.—This is to admit the fresh, outside air into an adjoining hallway or room which can be heated. From this room the warm, fresh air may pass into the sick-chamber through an open door or window; the patient's bed being so placed as to be out of any direct draught or current of air.

Clothing.—In order to secure immunity from atmospheric exposure it is necessary that warm clothing should be worn—thicker and warmer than the clothing usually worn at the corresponding season of the year. Wool or silk under-garments are by far the best as they radiate the body heat and moisture gradually and are less apt to cause a feeling of chilliness after perspiration. If the weather is very warm, light-weight wool garments can be procured, which will be but little warmer than cotton or linen and at the same time preserve uniform body temperature.

Baths should be indulged in only near the end of convalescence, when health appears to be almost fully established. They should be very short and taken at least a half an hour before and two hours after a meal. It is well to employ those of a stimulating character, such as salt baths, bran baths, baths containing alcohol or whiskey, and so forth. Great precautions should be observed against the slightest exposure to draughts of air for some time after coming out of the water. After bathing the body should be well dried with rough bath-towels, rubbing the skin vigorously enough to bring a healthy glow to the surface. During convalescence from diseases of the respiratory apparatus baths should be strictly forbidden. (The previous remarks do not apply to baths administered during the active period of the disease, for the purpose of reducing fever, cleanliness, and so forth.)

Massage is beneficial in most cases of convalescence after they become strong enough to withstand the somewhat vigorous manipulations. The motions of massage differ in character; beginning with firm stroking with

the palms of both hands they gradually change to a kneading motion, and end with percussion or a rapid tapping of the muscles.

Massage is generally practiced upon the bared skin, using enough fresh cocoanut oil to enable the operators hand to glide easily over it and render the skin soft and pliable. The object is to bring fresh blood to the muscles and stimulate the tissues to greater activity, and consequently is of great value in convalescing cases in which the muscles are soft and flabby and the circulation sluggish.

Food of Convalescence.—The diet must be carefully regulated and the following rules rigidly adhered to: In the first place, proportion the amount and character of the nourishment, not to the hunger of the patient, but to the digestive power of his stomach. Instruct him to eat often and but little at a time, to chew the food very thoroughly, not only to secure its reduction to small particles, but also its complete admixture with the salivary fluids. And lastly, to choose those articles of diet which are adapted to the comparative feebleness and sensitiveness of the digestive organs and as far as possible, also, those which gratify the taste of the individual.

Generous Nourishment.—We must guard, however, against a disposition to restrain the patient too much in regard to nourishment, through an exaggerated fear of the effects which it may produce. It is essential to take into consideration the degree of appetite and the sensations which the convalescent experiences during the process of digestion. Also to consider how his illness has effected the several digestive organs, for, of course, the kind and quantity of nourishment must vary with the nature and duration of the illness from which recovery is taking place.

Examples.—For instance, a patient who is convalescing from typhoid fever, which has its seat in the intestine, should not be allowed to eat plentifully of foods which receive a large part of their digestion in that organ, as fats, starches, and so forth. Nor should a patient who has had a congested liver partake of fatty food to any great extent—simply because bile is required to digest fats and the disease has to do with a lessened supply of bile.

The Patient Must Diet.—Stimulating food given to an intensely nervous patient would only aggravate the condition, while a routine diet, without change or character, would be torture to one recovering from a long, chronic illness.

In other words the diet must suit the patient, not the patient the diet. There are many cases in which physicians and nurses gain more

credit with a patient and his friends by a very minute attention to the diet during convalescence than by the most skillful treatment of the disease throughout its course.

Diet.—As a general rule a patient may begin with weak chicken or mutton broth, free from fat, and boiled rice, which probably represent the two great classes of nitrogenied and amylaceous articles of food in their most easily assimilated form. Experiments have shown that rice is digested in less time than any other substance of the kind, only requiring one hour. The rice may be substituted by tapioca, sago, or cornstarch, made with milk, if these are more palatable, according to the directions on a previous page.

Progressive Diet.—After from two to four days, if improvement continues, administer stronger soups, eggs very slightly boiled, calf's-foot jelly, rice-pudding and toasted bread, or stale bread with very little butter. In the course of a week the patient may proceed to a mealy roasted white potato, a tender mutton chop, or tender loin of beef, and light bread not less than twelve hours old, with sweet butter in moderate quantity.

It is much better and saves time for the invalid to go up the inclined plane of diet (never to ascend this hill of difficulty by jumps) a little slower than is absolutely necessary, than to advance too rapidly and bring on a relapse.

A Correct Guide.—The surest guide is the condition of the tongue; should that unruly member have cleaned off, as it usually does when full, frank convalescence sets in, go on carefully and cautiously up the list given above to stronger and more nutritious articles of diet. But should the tongue put on a coat of fur again, remember it is a sign of repugnance to such rich food as it has to help to swallow, and quickly taking the hint, put the patient back on liquid diet for a few days longer.

Medical Treatment.—During convalescence the secretions and excretions must be carefully watched over and any excess or insufficiency be corrected as soon as practicable. The patient should be encouraged to drink a great deal of water (between meals, and not at meals—this also, applies to the healthy individual) for water is an absolute necessity to the secretions, which if right will bring health much closer to hand.

Copious Perspirations, which are very apt to occur from simple relaxation of the tissues and integument, may be checked by six or eight grains of quinine, or by one-hundredth of a grain of atropia, or by sponging with a solution of alum and whiskey before retiring.

The Urine.—If the urine is rather scanty the patient should drink

freely of water, or of some bland fluid, such as flaxseed tea, toast-water or gum-arabic water.

Constipation.—Constipation should be overcome by injections, or by tonic laxatives, such as rhubarb, in doses of five or ten grains daily. If convalescence is protracted and the patient does not regain strength as fast as should be expected a tonic containing iron and strychnia is indicated.

Surroundings of the Patient.—Those who have suffered from a protracted illness will remember how monotonous it became to lie in bed with your vision limited to one side of the room, or to a narrow strip of sky or landscape which could be seen through some particular window. You soon learned every detail of the room and its furniture; even the figures on the wall-paper took on grotesque forms and seemed perfectly hateful to you.

Chamber Arrangement.—Consequently the furnishing of the sick-chamber, the arrangement of the bed gives us another topic in connection with the treatment of convalescence. While the sick-room should have as little furniture in it as possible (especially if the disease be contagious or infectious), yet what there is should be arranged with a view to cheerfulness and brightness.

Flowers.—Flowers or potted plants, brought in from time to time, give the patient a change and brightens him up. If possible the position of the bed should be changed from one part of the room to another so as to give the enforced occupant a new field of vision, especially if it be so that he can look out of a window. All these little details make sickness more bearable; taking away the gloomy thought goes a very long way toward establishing a speedy convalescence.

Visiting.—During the tedious convalescence which we often watch so anxiously after prolonged chronic diseases, or after relapses from more acute attacks, visits are capable of accomplishing great good if properly managed. Every care should be taken not to depress a patient who is slowly recovering, by allusions to unfavorable terminations in cases similar to his own. A sick person does so enjoy hearing good news; for instance, of a love and courtship which has a happy ending. Sick persons also intensely enjoy hearing of any material good, such as a positive or practical success of the right in their own neighborhood or country, or, indeed, in any part of the world.

Books.—They have generally a surfeit of books, principles, precepts and theories; so, instead of advising them about their convalescence, with

advice which they have heard at least fifty times before, tell them of one benevolent act which has really succeeded practically—it will be like a day's health to them. It is hard for people to understand how intense is the craving of invalids, who, with reanimated powers of thinking, are still cut off from active participation in the world's work and progress, to hear of good, practical action even when they cannot yet partake of it.

Society.—In many instances there is no better society for a convalescent than that of babies, or of other invalids who are also convalescent; but, of course, this association must be carefully managed so that neither party will suffer from it, which is perfectly feasible as a rule. If you think the air of a sick-room is bad for an infant, of course it is injurious to the invalid also; and efforts should be made to remedy the aerial impurity without a moment's delay. It enlivens a sick person's whole mental atmosphere to see "the baby," and a very young child, if unspoiled, will generally adapt itself wonderfully to the ways of a sick person if the time they spend together is not too long. A small pet animal is often an excellent companion for a convalescent patient, especially if confinement to the house in consequence of unfavorable weather or complications of the original disease setting in, is unusually prolonged. A pet bird in a cage has sometimes proved the only pleasure, or, indeed, solace of an invalid shut up in the same room for weeks, or even months. If such a pet can be fed, cleaned and taken care of in every way, and perhaps taught some of the little tricks which birds, squirrels and even mice are capable of learning, and which prove such a source of pride to the trainer and entertainment to visitors, the patient should by all means be encouraged to undertake the task. By such devices many a weary hour has been whiled away, and the sick-chamber of lingering convalescence shorn of half its almost intolerable weariness.

First Walks.—The first walks or rides should receive special attention, the convalescent being warmly clothed, a warm sunshiny day being selected, in accordance with the rules given under meteorology, and the exposure being at first for only fifteen minutes, or half an hour at the furthest.

Change of Air and Scene.—After the invalid is strong enough to leave the house complete change of air and scene is one of the most potent contributors to an entire restoration to health. The patient, who has remained for three weeks in nearly the same state, growing neither better nor worse, will often wonderfully improve after a few days spent in the country or at the seashore. If the period of sickness has been passed in

a room where the only view was of the backs of houses or the fronts of those forming the opposite side of the street, how grateful and invigorating is the sight of green fields, shady groves and sparkling streams at some sylvan retreat. By the ocean, too, vitalizing sea breezes frequently exert an almost magical power over a frame enfeebled by disease and restore to the languid convalescent his wonted vigor with astonishing rapidity.

Avoid Excitement.—Lastly, try to secure the patient against any intense mental emotion or intellectual excitement, which will be almost sure to react with unfavorable effect upon his enfeebled physical powers.

Reconstructive Remedies.—These must be administered in a form ready to be taken up by the assimilative functions and transferred to the wasted tissues. Chemistry teaches us the exact nature of the elements destroyed by disease, and thus gives the clue to rational scientific treatment. There is need of food structure for muscle, blood, nerve, bone and the numerous other tissues. The need is a complex one, and the remedy must be, likewise, complex in its chemical nature. It is true that *all* the elements of the tissues have been wasted; but there is one element which, because of its vital importance and wide distribution throughout the economy, must be specially provided for—this element is phosphorus.

A Question.—The question naturally arises: Is it possible to obtain a remedy that will meet all the requirements for checking the ravages of disease and replacing the structures wasted by the pathologic processes, *i. e.*, for checking destructive metabolism and fostering constructive metabolism?

The Blood.—It is self-evident that before a patient can reach convalescence the germ or virus causing the disease must be removed from the system. How shall we combat these germs? We cannot rely on sterilization. Happily we have discovered that normal, healthy blood is antagonistic to germ life, while impoverished blood furnishes a favorable nidus for their development.

Hypophosphites.—Experience has demonstrated that the remedy that fulfills all the indications for treatment is the *Compound Syrup of Hypophosphites.*

This remedy is based upon the broad philosophic basis of the exact needs of the system in diseases characterized by waste of tissue and loss of nervous force.

It should be used in teaspoonful doses, given in a wineglass of water before each meal and at bedtime.

PART III OF BOOK VII

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THE SICK ROOM IN THE HOME

PART III.

SPECIAL DIETS FOR VARIOUS DISEASES.

Mankind, whether well or ill, must eat to live. We must have food. But some foods are more nutritious than others,—some foods are good for one person and bad for another. It is important therefore for all people at all times to have careful regard to diet, but it is especially so in the case of those who are ill, for not only may certain things be taken with impunity when one is well, that would be injurious in illness, but different diseases need different diets, and oftentimes a diet that would be beneficial to a patient with one disease would prove dangerous, perhaps fatal, to the sufferer from some other disease.

Diet in Acute Diseases.—The proper diet in acute diseases varies somewhat according to the individual affection, but is subject to general principles which are sufficient guides for most cases.

When Food is Not Needed.—In acute febrile diseases which have a very short duration, from one to three days, it is not necessary that the patient take food, as his vitality is strong enough to tide him over. Again, during the first day or two of pneumonia, scarlet fever, or similar affections, there need be no alarm even if the patient take no food, as his strength is sufficient, and often he has absolutely no inclination for food.

When Food is Needed.—But after the fever has been prolonged more than one or two days, then, it becomes necessary to nourish the patient, even though it be against his will, for the tendency to fatal results in all such cases is through exhaustion, and much can be done toward preventing a failure of the vital power by proper feeding.

NOURISH THE PATIENT; DON'T STARVE A FEVER.

Food in Fevers.—The older writers upon dietetics taught that a fever patient was not to be fed, and some modern authors still follow the old teaching. However, fever is *not* a contra-indication to food—to be sure, if the stomach is overloaded with coarse food it will only augment the

condition, but if proper care is taken in selecting a diet there will be few bad results and many good ones.

LIQUID MEAT FOODS.

Fresh Meat Juices.—This is the most nutritious of this class, but as a rule it is not taken well by the average patient, owing to its insipid flavor. It may be added to the patient's milk, or used in making broth, about a tablespoonful being given at a time. Beef juice is made by cutting prime, lean beef into small pieces and pressing until all the juice is extracted from the meat. A little salt added to fresh beef juice makes it more palatable.

Beef Tea has an undeserved reputation, for it has but little nourishing property, and to have any effect it must be given in large quantities. It is, however, slightly stimulating.

Liquid Peptonoids are by far the best prepared meat food in typhoid fever, containing as they do the active and nourishing principles of beef, they are especially adapted to the conditions found in typhoid fever. This preparation of beef is manufactured by all reputable pharmaceutical firms, and can be procured from any drug store. It should be given in milk, or alternated with it, every two or three hours, a teaspoonful to a tablespoonful constituting the usual dose.

Soup and Broth resemble beef tea, in that they contain the extractives of meat, but they also contain nutritive substances, but vary greatly according to preparation, the lighter forms of soup being spoken of as broth.

Preparation of Broths.—To prepare broth, use young chicken, lean, fresh beef, or mutton, without fat, allowing the meat to boil slowly for four or five hours (until it falls to pieces), strain, cool and skim off what little fat appears. This liquid may then be seasoned and diluted to the strength required by the patient.

Administration of Broths.—As broths are stimulating as well as nutritious, they should not be administered to a typhoid patient until the third or fourth week, by which time the milk and peptonoid diet will have become exceedingly tiresome, and the new nourishment will be relished and at the same time adapted to the conditions of that period of the disease.

Eggs may be given cautiously throughout the disease in combination with milk as egg-nog, which is made by adding the yolk of an egg to half a pint of milk, with a tablespoonful of whiskey, wine or brandy, and then

beating in the white of the egg. This should be given sparingly in any delicacy of the stomach.

Stimulants are given by many physicians throughout the disease, but unless the individual case requires stimulation from the beginning it is best to defer the administration of alcoholics until the middle of the second week, or until the time when the organism requires energetic artificial stimulation.

What Stimulants to Use.—Whiskey, brandy and the light wines can all be used, either slightly diluted in doses from a teaspoonful to a tablespoonful, every two or three hours, or incorporated with the medicine or food. As mentioned above, whiskey or brandy can be given in the form of egg-nog, or milk-punch, thus exhibiting both the stimulating effects of the liquor and the nourishment of the milk and eggs. A light, powerfully stimulant beverage is made by the addition of champagne to milk, and is especially applicable to a weak stomach.

Feeding by Enema.—In extremely serious cases of typhoid fever, or when the stomach will not retain proper nourishment, it is often necessary to sustain strength by rectal feeding. For this purpose, strong, black coffee, solutions of beef peptonoids, beef tea, beaten eggs and milk, etc., are injected well up into the intestine by means of a long rectal tube. In this form of feeding a very much larger quantity of food should be used than by the mouth.

Diet of Convalescence.—After the acute symptoms have all subsided and the temperature has been normal for ten days or two weeks, the diet may gradually be increased. For the first few days boiled rice, corn-starch pudding, oat-meal porridge or sago porridge may be given in small quantities. This may be followed by a portion of a soft boiled or poached egg, or milk toast made from old bread. On the fifth or sixth day a little dry toast with a baked apple or potato may be eaten; this can be followed by finely chopped lean beef, broiled, and light bread which is a day or two old, with a little fresh butter.

Increase of Diet.—From this diet gradually increase to a tender piece of chop or steak, small quantities of well-cooked green vegetables, and so forth, always remembering that the seat of the disease is in the intestine, and standing ready to cut the diet down on the appearance of diarrhœa, a return of fever or other unfavorable symptom.

During convalescence it is not usually advisable to continue the use of stimulants, although the malt liquors, as ale, porter and malt extract are at times beneficial.

Full or Extra Diet.—Fourteen ounces of bread; one pint of porter for males, half a pint of porter for females; six ounces of dressed meat, roasted or boiled, alternately, with eight ounces of potatoes; half a pound of rice pudding three times a week; half a pint of mutton broth in addition on days when boiled meat is given (which is four times a week); or, occasionally, one pint of strong vegetable soup, with meat and rice pudding, twice a week; one ounce of butter each day; porridge, gruel and barley water as required.

Middle or Ordinary Diet.—Twelve ounces of bread; half a pint of porter; four ounces of dressed meat roasted and boiled, alternately, with eight ounces of potatoes; half a pound of rice pudding three times a week; half a pint of mutton broth in addition on days when boiled meat is given (which is four times a week); or, occasionally, one pint of strong vegetable soup with meat and rice pudding, twice a week; with the full diet allowance of bread; one ounce of butter each day; porridge, gruel and barley water as required.

Low Diet.—Ten ounces of bread; half a pint of beef tea, mutton broth, rice, arrowroot, or sago, when specially ordered; three-quarters of an ounce of butter; gruel and barley water as required. Wines and spirits, if used, must be mentioned each time the physician or surgeon attends.

It is to be observed that even with those who are well exact diet should vary with different people according to their temperament and occupation. A person of nervous temperament may not indulge in seasoned foods with the same impunity that one of phlegmatic temperament, and the diet of a person of sedentary habits is necessarily more restricted than that of one who is engaged in the open air or in manual work.

The following particulars as to foods and drinks that may and may not be taken during the period of certain different ills will be found of great value in the sick room and in the care and treatment of all who are ill. The importance of eating slowly and properly masticating all food cannot be too strongly urged, and it is particularly to be desired that care and worry should be banished at meal time and cheerfulness prevail. After eating, even with the well, it is of great benefit to lie down and rest for twenty or thirty minutes.

ASTHMA.

General Rules.—The diet should be normal and not stimulating.

BENEFICIAL.	DETRIMENTAL.
Soups.—As desired, but in moderation. *Fish.*—As desired. *Meats.*—As desired. Preferably lean. *Vegetables.*—All kinds. *Fruits.*—All kinds. *Drinks.*—Water, cocoa, milk, tea, coffee.	Alcohol, irritating spices or sauces.

BRIGHT'S DISEASE.

General Rules.—When acute symptoms are present diet should be small in amount, very bland and preferably liquid, viz: milk. In the subacute or chronic form, a more liberal diet is needed to preserve proper nutrition and strength. Large amounts of liquids should not be taken continuously for more than a few days at a time, especially if the heart is weak or dropsy is present. Avoid all high seasoning.

BENEFICIAL.	DETRIMENTAL
Soups.—Weak broths with rice or barley, thin vegetable soups. *Fish.*—Fresh fish, boiled or broiled, raw oysters, raw clams. *Meats.*—Beef, mutton, lamb, poultry, all sparingly. *Farinaceous.*—Hominy, oatmeal, wheaten grits, rice, with milk or cream sparingly, stale bread, whole wheat bread, toast, milk toast, biscuits, macaroni. *Vegetables.*—Potatoes, peas, beans, spinach, cabbage, cauliflower, tomatoes, onions, lettuce, watercress, mushrooms. *Desserts.*—Rice and milk puddings, stewed apples, stewed pears, berries. *Fruits.*—Ripe apples, pears, grapes, berries. *Fluids.*—Pure water (restricted) peptonised milk, fresh buttermilk, Bulgarian sour milk, milk with hot water, equal parts, whey, weak tea and weak coffee (restricted), toast water, unfermented grape juice and fruit juices (restricted).	Strong meat broths and extracts, fried fish, pork, corned beef, heavy bread, batter cakes, asparagus, celery, hashes, stews, gravies, strong condiments, such as curry, pepper, mustard, radish, etc., cakes, pastry, ice cream, malt or spirituous liquors, cranberries, fruits with kernels.

CONSTIPATION.

General Rules.—Diet should consist largely of easily digested fats and oils, green and fresh cooked vegetables, such as leave a large residue in the bowels. Moderate exercise and regularity in habits are important adjuncts to treatment. Active cathartic drugs should be avoided.

BENEFICIAL.	DETRIMENTAL
Soups.—Meat broths, oyster soup. *Fish.*—Boiled fresh fish of all kinds, raw oysters. *Meats.*—Almost any fresh tender meat, poultry, all in moderation. *Farinaceous.*—Oatmeal, wheaten grits, mush, hominy, whole wheat bread, corn bread, graham bread, brown bread, rye bread, bran biscuit or muffins. *Vegetables.*—Boiled onions, brussels sprouts, spinach, cauliflower, potato, asparagus, green corn, green peas, string beans, salads, with oil. *Desserts.*—Stewed prunes, figs, baked apples with cream, ripe peaches, pears, oranges, apples, melons, grapes, huckleberries (the blue seedless kind), cherries, raisins, honey, plain puddings, fig-puddings, apple charlotte. *Fluids.*—Plenty of pure water, cold or hot, black coffee, cocoa, new cider, buttermilk, Bulgarian sour milk, orange juice, unfermented grape juice.	Salt, smoked, potted or preserved fish or meats, liver, eggs, new bread, puddings of rice or sago, pastry, milk, sweets, tea, nuts, cheese, pineapple, spirituous liquors.

Above all other means for removing constipation are those hygenic applications derived from the natural stimulus of the intestinal movements—food. If there is no contra-indications, those foods which leave a considerable residuum—as Graham flour, bran, rye and corn bread, groats, oatmeal, cracked wheat and oats, and so forth—can be used with advantage; fresh vegetables as lettuce, spinach, celery, onions, the various vegetables known as greens, and so forth, and fruits as apples, dried peaches, figs, dates, tamarinds, prunes, and so forth.

A large draught of plain or carbonated water should be taken before breakfast. The alkaline mineral waters, as Saratoga, Pullna or Hunyadi,

taken in this way usually give excellent results. As a sedentary life induces constipation, it follows that sufficient exercise must be enjoined in all such cases.

Consumption.—See Phthisis.

DEBILITY.

General Rules.—

BENEFICIAL.	DETRIMENTAL
Soups.—Any broth thickened with farinaceous material, chicken or beef soup containing chopped meat, rich vegetable soups, whole beef tea. *Fish.*—All fresh fish, boiled or broiled, raw oysters. *Meats.*—Beef, mutton, chicken, boiled ham, lamb chops or cutlets, broiled bacon, tender juicy steak, hamburger steak. *Eggs.*—Soft boiled, poached, scrambled, raw with sherry wine. *Farinaceous.*—Cracked wheat, rolled oats, corn meal mush, sago, tapioca, hominy, barley, macaroni, vermicelli, rolls, biscuits, cakes, whole wheat bread, corn bread, milk toast, dry toast, brown bread. *Vegetables.*—Nearly all, perfectly fresh and well cooked. *Desserts.*—Custards, egg-and-milk, rice or apple puddings, baked apples, fruit-jams, jellies, cocoa-junket, marmalade, sweet fruits, calf's-foot jelly. *Fluids.*—Cocoa, chocolate, milk—hot, cold, or peptonised, Laibose, Bulgarian sour milk, pure water, plain or aerated, Panopepton on cracked ice.	Hashes, stews, cooked oysters or clams, pork, veal, thin soups, turkey, salt meats except ham and bacon, cabbage, cucumbers, turnips, carrots, squash, spices, pickles, vinegar, pies, pastry, bananas, pineapples.

DIABETES.

General Rules.—Avoid all sugars and reduce starches to a minimum. Increase the amount of meats and especially oils and fats. Substitute saccharin for sugar.

BENEFICIAL.	DETRIMENTAL
Soups.—Soups or broths of beef, chicken, mutton, veal, oysters, clams, terrapin or turtle (not thickened with any farinaceous substances), beef tea. *Fish.*—Shell fish and all kinds of fish, fresh, salted, dried, pickled, or otherwise preserved (no dressing containing flour). *Eggs.*—In any way most acceptable. *Meats.*—Fat beef, mutton, ham or bacon, poultry, sweetbreads, calf's head, sausage, kidneys, pig's feet, tongue, tripe, (all cooked free of flour, potatoes, bread, or crackers). *Farinaceous.*—Gluten porridge, gluten bread, gluten gems, gluten biscuits, gluten wafers, gluten griddle cakes, almond bread or cakes, bran bread or cakes. *Vegetables.*—String beans, spinach, beet-tops, chicory, kale, lettuce plain or dressed with oil and vinegar, cucumbers, onions, tomatoes, mushrooms, asparagus, oyster plant, celery, dandelions, cresses, radishes, pickles, olives. *Deserts.*—Custards, jellies, creams (all without sugar); walnuts, almonds, filberts, Brazil nuts, cocoanuts, pecans. *Fluids.*—Tea or coffee (without sugar), pure water, peptonised milk, Bulgarian sour milk, lemonade, seltzer water with lemon juice (no sugar).	Liver, sugars, sweets or starches of any kind, wheaten bread or biscuits, corn bread, oatmeal, barley, rice, rye bread, arrowroot, sago, macaroni, tapioca, vermicelli, potatoes, parsnips, beets, turnips, peas, carrots, melons, fruits, puddings, pastry, pies, ices, honey, jams, sweet or sparkling wines, cordials, cider, porter, lager, chestnuts, peanuts.

DIPHTHERIA.

Putrid Sore Throat. Malignant Quinsy.

Milk Diet Required.—The diet should be concentrated and highly nutritious from the onset, embracing the necessary variety of alimentary principles. Milk meets preëminently these requirements.

Difficulty of Nutrition.—A serious difficulty in the treatment often arises from the invincible repugnance to nutriment, and sometimes from the persistence of vomiting. Owing to the difficulty of alimentation in such cases, and sometimes a want of appreciation of its importance, death takes place from innutrition.

Items of Proper Diet.—Milk, eggs, broth, peptonoids, beef juice or essence, peptonized oysters, eggnog or milk-punch should be given at

intervals of every two or three hours. If swallowing is so difficult as to prevent the patient from taking a proper amount of food, resort must be had to nutritious enemata. The following is a suitable formula:

Milk .....1 ounce
Whiskey .....½ ounce
Egg .....1 ounce
Add a little salt, beat up and warm.

Stimulants.—Stimulants should be used boldly from the start, guiding the dose by the effects. It is surprising to observe the large amount which can be taken even by the tenderest subject, without bad results. Usually a child of two years requires from thirty to sixty drops of whiskey or brandy every two or three hours; an adult, from two to three teaspoonfuls every three hours. However, this amount can be greatly increased if necessary. It is a mistaken idea to wait until symptoms of debility appear in diphtheria before using alcoholic stimulants.

DIARRHŒA.

General Rules.—Diet should be mainly liquids and during an acute attack all food should be stopped for about twelve hours. Avoid foods that ferment easily or that leave an undigested residue, thus causing intestinal irritation. Take food in small quantities at frequent intervals.

BENEFICIAL.	DETRIMENTAL
Soups.—Milk soup well boiled, clam juice, beef tea. *Meats.*—Scraped fresh beef or mutton well broiled, sweetbread, beef juice from freshly broiled steak (all sparingly). *Eggs.*—Lightly boiled or poached on dry toast, boiled white of egg. *Farinaceous.*—Rice, sago, macaroni, tapioca, arrowroot, dry toast, milk toast, toasted crackers. *Desserts.*—Milk-puddings, plain, with sago, rice, tapioca or arrowroot (no sugar). *Fluids.*—Tea, toast water, boiled peptonised milk, Panopepton, Panopepton and whey.	Oatmeal, wheaten grits, fresh breads, rich soups, vegetables, fried foods, fish, salt meats, lamb, veal, pork, brown or graham bread, fruits, nuts, pies, pastry, ice cream, ice water, sugar, sweets, custards, malt liquors, sweet wines, iced drinks.

DYSENTERY.

As in this disease the nutrition suffers severely the correct diet is important from the beginning. If the stomach is irritable, milk, with one-fourth lime-water, is the best food. If there is but little nausea, and especially if the digestion remains good, the patient can take milk, eggs, beef juice (which is particularly adapted to this condition), ice cream, boiled custard, oyster soup, mutton, chicken and beef broth, and similar articles. But solids leaving much residuum, and especially coarse articles, are highly objectionable.

DYSPEPSIA.

General Rules.—Eat slowly and masticate thoroughly. Avoid all stimulants and culinary delicacies, iced or very hot drinks; no sweets and no acids.

BENEFICIAL.

Soups.—Clear thin soups of beef, mutton, or oysters.

Fish.—Oysters raw, fresh boiled or broiled bass, white fish, shad, cod, trout, no rich sauces.

Meats.—Broiled tender steak or chop, roasted or boiled beef, lamb, mutton, chicken, calf's head, sweetbread, broiled chopped meat.

Eggs.—Boiled, poached, raw, any way that agrees.

Farinaceous.—Cracked wheat, hominy, rolled oats, rice, sago, tapioca, crackers, dry toast, stale bread, corn bread, whole wheat bread, graham bread, unsweetened rusk or zwieback, macaroni.

Vegetables.—Potato (sparingly), spinach, sweet corn, green peas, string beans, asparagus, stewed celery, well-boiled onions, lettuce. Vegetables sometimes best made into purees, thoroughly cooked, then passed through colander or sieve. Cream, fresh butter, best olive oil, may be used with farinaceous or vegetable foods, if agreeable.

Desserts.—Rice, tapioca, or farina pudding, junket (directions on back of

DETRIMENTAL

Rich soups or chowders, veal, pork hashes, stews, turkey, gravies, fried foods, liver, kidney; pickled, potted, corned or cured meats; salted, smoked or preserved fish; goose, duck, sausage, crabs, lobster, salmon, pies, pastry, candies, ice cream, cheese, nuts, ice water, strong condiments, pickles, malt or spirituous liquors.

BENEFICIAL.	DETRIMENTAL
slip), custards, apple snow, baked and stewed apples and pears, ripe fruits. Fruits usually best taken in morning or early part of day, not after a full meal, oranges, grape fruit, etc. *Fluids.*—Hot water before meals. At meals, one cup weak tea, coffee, cocoa, milk and hot water equal parts, one glass pure cool water, sipped toward end of meal. Milk, plain or peptonised, buttermilk, Bulgarian sour milk, whey, whey and unfermented grape juice, Ponopepton and whey, Panopepton on cracked ice.	

FEVERS.

General Rules.—A nourishing diet for the strength of the patient must be kept up, but solids are not permissible and in liquid and semi-liquid foods care is necessary that they are easy of digestion.

BENEFICIAL.	DETRIMENTAL
Foods.—Soups, clear, or thickened with some well cooked farinaceous substance, mutton, clam or chicken broth, beef tea, peptonised milk, Laibose, Bulgarian sour milk, Panopepton with cracked ice, Panopepton with whey. *Fluids.*—Pure cold water, toast water, lemon or orange juice in cold water, jelly water, cold whey, all in small quantities, sipped slowly.	Any solid or vegetable food or fruit, until so directed by the physician in charge.

FEVER, CEREBRO-SPINAL.

Cerebro-Spinal Typhus, Meningitis, Spotted Fever.

Generous Diet Needed.—This disease may be very rapid in its course and terminate in from four to seven days, or again, it may continue for six or eight weeks, according to the length of its stages and their particular conduct. Consequently a generous and sustaining diet must be inaugurated from the onset.

Items of Diet.—Milk, eggs, beef juice, liquid peptonoids, mutton broth, and so forth, should be given every three hours, day and night, to avoid paroxysms of weakness in the early morning. Very often food can-

not be taken by the mouth, in such cases nutritious enemata should be used as in typhoid fever. The alcoholic stimulants: whiskey, brandy, wine, and so forth, should be given freely every few hours.

FEVER, PERNICIOUS.

Pernicious Malarial Fever. Congestive Fever.

Full Diet Needed.—The diet in pernicious malarial fever should be full; plenty of meat, milk and eggs. During the attacks it should be cut down to liquid food, often repeated. In the gastro-enteric variety of the disease the diet should be the same as in acute dysentery.

FEVER, SCARLET.

A Supporting Diet Needed.—As the disease runs a rapid, definite course, the diet must be supporting and nourishing from the start; milk, beef peptonoids and eggs fulfilling the indications. Alcoholic stimulants are indicated in proportion to the frequency and feebleness of the pulse, together with general prostration. Alcoholics are to be given with discrimination, however, their precise effects being noticed. The malignant type of the disease requires that stimulants should be used freely. In children, wine-whey, milk-punch and egg-nog are eligible forms for their administration.

Water Diet.—If the urine is scanty and high colored, the patient should be permitted to drink of water very freely, also milk and lime-water and cream-of-tartar lemonade, in order to promote proper renal secretions.

FEVER, TYPHOID.

General Rules.—All foods given in protracted febrile states should be in liquid form. This is especially true in typhoid fever, in which disease it should be continued until ten days or two weeks after the temperature has returned to normal.

Of all liquid foods, milk is by far the best and most serviceable in typhoid fever. It is taken, if not with relish, at least with less reluctance than other articles, and it has the great advantage of embracing in proper combination all the ailmentary principles required for nutrition.

Care should be taken that the milk is of a good quality and comes from healthy cows. In preparing it for the patient it is often necessary

that it be iced in order to make it more palatable, or, if it is thought to be questionable in quality, it should be sterilized or boiled.

Should the stomach reject milk when taken as it comes from the dairy it may be diluted with ice-water, lime-water or barley-water. Again, if the regurgitated milk shows signs of non-digestion, it should be artifically digested with peptonizing powder (which can be procured at any pharmacy) before administering to the patient.

One or two ounces of milk should be taken every three hours during the day, and at night not more than four hours should elapse without food and stimulants being administered. While sleep is essential, yet a patient is not harmed by the partial awakening which is sufficient for the administration of a milk-punch. Again, a careful nurse can give food at frequent intervals without awakening him.

During convalescence, commencing the third day after disappearance of all fever, the diet must become varied, utmost effort being made to build the patient up with most nourishing food. The first day or two give only milk and broths, with perhaps a little beef juice twice during day. The next day a little stale bread may be added to this and a cup of cocoa may be given. The third day custard may be given or a soft boiled egg and each day thereafter the diet may be slightly increased. By the seventh day breast of broiled chicken may be given and by the tenth day the diet may become general. Throughout convalescence peptonized milk should be given three or four times between meals and a glass of sherry or burgundy.

General Rules.—Avoid eating rich or highly seasoned foods, but take good nourishment to keep up the general strength. Avoid exercise and sexual excitement.

BENEFICIAL.	DETRIMENTAL
Soups.—Clear soups, oyster soup.	*Soups.*—Clam chowder, nor rich meat soups.
Fish.—All kinds, if boiled.	*Fish.*—Smoked fish, lobster, crabs, clams.
Meats.—Lamb, mutton, chicken. Meats should be either boiled or broiled and eaten sparingly.	*Meats.*—Pork, veal, beef, smoked meats, salt meats.
Farinaceous.—Graham bread, brown bread, bran bread, corn bread, rye bread; whole wheat bread; oatmeal porridge, cereals.	*Farinaceous.*—White bread; rolls, griddle cakes, cheese, custard pies, cakes, hot biscuits.
Vegetables.—Spinach, brussels sprouts; asparagus, string beans, lettuce, celery.	*Vegetables.*—Cabbage, tomatoes, turnips, carrots, baked beans.
Drinks.—Lemonade, milk, unfermented grape juice, pure water, one glass laxative early each morning.	*Drinks.*—Ales, porters, wines, tea, coffee, cocoa, ginger ale, nor any other alcoholic or stimulating beverages.

GOUT.

General Rules.—Restrict the use of starches and meat. Pure water should be taken freely, but not to excess. Alcohol and sweets should be entirely interdicted.

BENEFICIAL.	DETRIMENTAL
Soups.—Clear soups, vegetable soup, clam and oyster broths. *Fish.*—Fresh fish, raw oysters. *Eggs.*—In moderation, preferably soft boiled or poached. *Meats.*—(Once a day only, principally white meat.) Chicken, ham, bacon, sweetbreads, mutton, lamb, very little beef. *Farinaceous.*—Whole wheat, corn or brown bread, dry toast, milk toast, zweiback, rye (stale only), crackers, hominy, cereals without sugar. *Vegetables.*—Potatoes (small quantities only), spinach, green peas, cabbage (well boiled), green vegetables, salads, string beans. *Desserts.*—Fresh or cooked fruits, ices, rice pudding, baked apples (very little sugar), cheese, nuts or almonds. *Beverages.*—Water plentifully, plain soda, milk, buttermilk, coffee, lemonade (no sugar).	Cakes, sweets, pork, veal, fried meats, cooked oysters, salted, dried, potted or preserved fish or meats (except fat bacon or ham), crabs, lobster, sweetbreads, kidneys, hard boiled eggs, rich made dishes, gravies, raw tomatoes, rhubarb, pies, pastry, tea. *Absolutely forbidden.*—Malt liquors, sweet wines, champagne.

Gouty.—Gouty patients may, for the purpose of dietetic discussion, be arranged in three classes: first, those who are robust and vigorous; second, those who with a distinct feebleness of constitution and sluggishness of habit have a marked tendency to the accumulation of fat; third, those whose nutrition and general vital forces are habitually on a low level.

In robust gouty persons it is essential that the quantity of food be lessened; such persons should be taught to habitually rise from the table with the appetite not entirely satisfied. In the second class of patients some control over the appetite is not rarely imperative, while in the third class of patients it is often equally essential to administer food beyond the cravings of the stomach.

What to Avoid.—There are certain articles of food which should be denied to all gouty subjects. First of these is cane sugar, acid fruits, including the tomatoes and strawberries, are also to be avoided by all

gouty subjects, while non-acid fruits, if ripe, are almost invariably of great service and should be taken freely. The harm done by acid fruits is largely due to their irritating effects upon the organs of digestion.

HEART AND BLOOD VESSELS.—DISEASES OF.

General Rules.—Food should not be taken at short intervals as digestion is slow. Allow an interval of five hours between meals. All meals should be moderate in amount and sugars and starches restricted, especially if there is a tendency to flatulence.

BENEFICIAL.	DETRIMENTAL
Soups.—(In moderate amounts.) Clear vegetable soup, purees and milk soups. *Fish.*—Fresh of all kinds, raw oysters and clams. *Meats.*—Beef, mutton, chicken, quail, partridge, grouse, lamb. *Eggs.*—Soft boiled or poached. *Farinaceous.*—Toast, crust of bread, zweiback, crackers, beaten biscuits. *Vegetables.*—Peas, string beans, spinach, lettuce, baked potatoes in small amounts. *Desserts.*—Fresh fruits, baked apples, pineapple, custards, gelatines. *Beverages.*—Milk, buttermilk, weak tea (with little sugar), coffee (small cup, clear), light dry wines.	Fried foods, candy, pastries, much coffee or tea, batter cakes, waffles, hot breads, sweet wines and much spirituous or malt liquors.

IMPOTENCY.

BENEFICIAL.	DETRIMENTAL
Soups.—Beef, mutton, oyster. *Fish.*—Codfish, halibut, bass, blue, white, shad, shad roe, lobster and crab, sardines, trout, mackerel, caviar, salmon. *Meats.*—Beef, lamb, mutton, chicken, turkey, game, fresh lean ham, bacon, tripe, sweetbreads. *Eggs.*—Soft boiled, poached or raw. *Farinaceous.*—Gluten, gocham, whole wheat and brown bread, oatmeal, barley, shredded wheat, peas, beans, hominy. *Vegetables.*—Spinach, cauliflower, as-	*Soups.*—Chowder, nor rich soups and spiced gravies. *Fish.*—Eels, clams, all fried fish. *Meats.*—Pork, veal, liver, goose, canned and potted meats, fried meats, sausages. *Eggs.*—Fried nor hard boiled. *Farinaceous.*—White bread, rolls, hot biscuits, wheat griddle cakes. *Vegetables.*—Cabbage, turnips, carrots, parsnips, melon, lettuce, pumpkins, mushrooms, rhubarb.

BENEFICIAL.

paragus, celery, potatoes (preferably baked), green peas, string beans, cucumbers, onions.

Desserts.—Rice puddings, cheese, oranges, olives, custards, figs, raisins, peanuts, walnuts, Brazil, pecan, hickory and other nuts.

Drinks.—Milk, cocoa, tea, coffee, malted milk.

DETRIMENTAL

Desserts.—Strawberries, blackberries, raspberries, currants, cherries, pies.

Drinks.—Beer, ale, porter, whiskey, gin, brandy, buttermilk, sour wines, vinegar, all alcoholic drinks.

INDIGESTION, GASTRIC (Chronic Gastritis).

General Rules. Small meals taken at regular intervals. Masticate thoroughly, eat slowly and avoid overloading the stomach. A limited amount of fluid with meals.

BENEFICIAL.

Soups.—Small quantity. Clear soups of beef, mutton, oysters. A little vermicelli, barley, rice or tapioca may be boiled with these.

Fish.—Raw oysters, weak fish, white fish, shad, perch, trout, smelt, fresh mackerel, whiting.

Meats.—Meat-juice, roasted or broiled beef (scraped or chopped), mutton, chicken, venison, fresh tongue, sweetbreads, lamb chops, squab, roast partridge, woodcock, plover, turkey (white meat).

Eggs.—Raw, soft boiled, baked, poached, plain omelette, or combined with chicken or oysters.

Farinaceous.—Bread at least one day old, brown bread, toast, rye, gluten and Graham bread, zweiback, crackers, cream crackers, cracked wheat, rice, sago, tapioca, arrowroot, corn meal, hominy, wheaten grits, Graham grits, vermicelli, rolled oats.

Vegetables.—Best made into puree by passing through a colander or mashing. Greens, spinach, French beans, green peas, asparagus, celery, potatoes (but little), preferably baked or mashed.

Dessert.—Cooked fruits, rice, tapioca, Indian and farina puddings, custards,

DETRIMENTAL

Rich soups and chowders, fried foods, hot or fresh bread, griddle cakes, doughnuts, veal, pork, liver, kidneys, hashes, stews, pickled and corned meats, preserved and potted meats, goose, duck, sausage, salmon, salt mackerel, bluefish, sturgeon, eels, shrimps, sardines, lobsters, crabs, cabbage, cauliflower, celery, radishes, cold slaw, cucumbers, parsnips, egg plant, turnips, carrots, squash, oyster plant, sweet potatoes, beets, tomatoes, corn, pastry, pies, made dishes, nuts, dates, jams, dried and candied fruits, candies, cheese, strong tea, ice water, malt liquors, sweet and effervescent wines and spirituous liquors.

BENEFICIAL.	DETRIMENTAL
rice, snow, rennet, gelatin creams, blanc mange, baked and stewed apples and pears, grapes and ripe fruits, if fresh. No rich sauces. *Beverages.*—Drinks should mostly be taken near the end of and between meals. Hot water before meals, milk, lime-water, weak tea (one-half ounce to the pint), koumiss, weak cocoa, peptonized cocoa and milk, buttermilk, malted milk. *Mineral Waters.*—French Lick (Pluto, Natural or Concentrated), Carlsbad, Vichy, Kissingen, Apollinaris, Poland Spring.	

INDIGESTION, GASTRIC (With Diminished Secretion).

General Rules.—Food should be small in bulk; very little fluid with meals. Lie down and rest after each meal. Articles enumerated should be taken in small quantities at a time, at frequent intervals. The comparative digestibility of animal and vegetable foods must be determined by experience and the diet regulated accordingly.

BENEFICIAL.	DETRIMENTAL
Soups.—Between meals. Beef, chicken, *Fish.*—Fresh only, boiled, broiled or baked; oysters. *Eggs.*—Raw, soft boiled or poached. *Fats.*—Very little butter or cream. No cooked fats. *Meats.*—Preferably scraped or chopped beef, mutton, lamb, broiled or roasted chicken, tongue, sweetbreads, thin crisp bacon, cold boiled ham. *Vegetables.*—Spinach, carrots, soft boiled turnips, asparagus, rice. *Farinaceous.*—Stale bread only, dry toast, zweiback, crackers. Cereals should be thoroughly cooked and eaten with salt and cream, no sugar. *Desserts.*—Small quantities only. Boiled or baked custards, rice, tapioca and sago puddings, jellies, compotes of apples and pears. *Beverages.*—Limited quantities between meals. Water (not iced), milk, cocoa, coffee, tea, light dry wines.	Soups and drinks, with meals. All articles of coarse texture that contain indigestible parts like tendons, skin, stems, husks, pips, seeds, etc. Carbonated and alcoholic beverages, very acid, very sweet or very salt foods, salads, freshly baked bread or cakes.

INDIGESTION, INTESTINAL.

General Rules.—Diet should contain a predominance of animal foods, *e. g.*, milk, eggs, fish, poultry, etc., avoiding especially sweets, insufficiently cooked starches, vegetables and fruits of the coarser varieties. Avoid all foods which occasion distress shortly after eating.

BENEFICIAL.	DETRIMENTAL
Soups.—Thin and containing little fat or vegetables. *Meats.*—Lean meat of beef, mutton, lamb, also partridge, squab, chicken, turkey (white meat), calf's brains, sweetbreads (no sauces or dressings). *Fish.*—Shell fish, trout, pike, sole, codfish, haddock, sardines, salmon. *Eggs.*—Raw, soft boiled (up to three minutes). *Fats.*—Good butter and cream in moderation. *Vegetables* (very little).—Cauliflower, asparagus, baked or mashed potatoes, fresh green peas (if tender). *Farinaceous.*—Toast, wheat bread, whole wheat, Graham, rye (stale only), cereals, as oatmeal, cream of wheat, Ralston's, Pettijohn's (thoroughly cooked), with salt and cream, very little sugar. *Dessert.*—Oranges, grape fruit, baked apples, stewed prunes, wine jelly, puddings (small amounts). *Beverages.*—Water (especially an hour or two after meals), milk, buttermilk, koumiss, light, white or red wines, cocoa, weak tea, very little coffee.	Fat meat or fish, sausage, meat sauces and dressings, boiled or fried meats, smoked meats, chipped beef, fritters, cakes, pan cakes, fresh bread, pastries, onions, carrots, turnips, tomatoes, cabbage, corn, salads, ice cream and water ices, cold drinks, whiskey and brandy, heavy wines, strong coffee or tea, strong condiments.

INFLUENZA.

La Grippe. Contagious Catarrh.

Diet Required.—Food consisting of milk and eggs should be administered at frequent intervals and in most cases, especially in elderly individuals, alcoholic stimulants should be given. When the pulse is soft and the stomach irritable, champagne will be found to be a most serviceable remedy.

Diet in Convalescence.—The prostration and loss of strength is very great after an attack of influenza, even though the duration has been short; and convalescence must be watched with much care. The diet should be increased as soon as possible to thick soups, rare beef and mutton and the easily digested vegetables. Malt liquors, porter, ale, stout, and so forth, are often indicated.

The rapid increase of consumption since the advent of influenza, a few years since, is very significant: convalescing patients should receive the most nourishing food, in order to fortify the organism against any tendency to chronic complications.

LIVER TROUBLE.

General Rules.—A bland mixed diet containing no alcoholic beverages, a minimum of fat, a small amount of animal food, plenty of fresh fruits, vegetables, milk, cereals, starches and a small amount of sweets. Spices and condiments should be excluded.

BENEFICIAL.	DETRIMENTAL
Soups.—Thin vegetable soups with a little bread or cracker, light broths, oyster broth. *Fish.*—Boiled fresh cod, bass, sole or white fish, raw oysters, soft part. *Meats.*—Tender lean mutton, lamb, chicken, sweetbread, all sparingly. *Farinaceous.*—Oatmeal, hominy, tapioca, sago, arrowroot, all well-cooked, whole wheat bread, graham bread, dry toast, crackers, zweiback, all sparingly. *Vegetables.*—Nearly all fresh vegetables, well-baked or boiled potato once a day, dandelions, green salads with French dressing. *Desserts.*—Plain milk puddings of tapioca, sago, arrowroot, junket, custards, stewed fruits, baked apples, stewed prunes if constipation. *Fruits.*—Fresh ripe oranges, grapefruit, peaches, pears, grapes, strawberries, if agreeable, ripe tender plums. *Fluids.*—Weak tea or coffee (without sugar or cream), hot water, pure water, plain or aerated, lemonade (with little sugar), milk, diluted or peptonised, buttermilk, Bulgarian sour milk, whey, orange juice.	Strong soups, concentrated meat extracts, rich made dishes of any kind, hot breads, preserved fish or meats, curries, pies, pastry, cakes, peppers, spices, mustards radish, horse-radish, raw onions, fats, sugar, herrings, eels, salmon, mackerel, sweets, creams, dried fruits, nuts, watercress, celery, malt liquors, sweet wines, champagne.

MEASLES.

The diet needs nothing more than actual mention. Milk constitutes the chief article of diet, especially if there is a trace of albumen in the urine. Iced drinks, calf's-foot jelly, custards, rice and tapioca puddings are very acceptable to the little patient, and can be given in moderation. Stimulants are seldom required.

NERVOUS AFFECTIONS.

Nervous prostration; nervous exhaustion. The question of feeding is one of great importance, and requires the utmost care and attention; the end to attain is to feed the patient as much as can be digested, but not to overfeed and derange the digestion.

Food should be given at intervals of two or three hours, and must be both light and nutritious. It should, at least at first, consist largely of milk, except in those rare cases in which this fluid does really disagree with the stomach and is not merely thought to do so. The milk should be skimmed or given in the form of koumiss.

Beef juice, or other concentrated meat essences are valuable as stimulants, and may be used as the basis of soups. Various farinaceous articles of food may be added to them; if an egg be broken into the concentrated bouillon or beef essence just as it ceases boiling, a nutritious and palatable dish is obtained. When constipation exists, oatmeal porridge, Graham bread and fresh or dried fruits may be allowed if they are readily digested by the patient.

OBESITY.

General Rules.—Avoid starches, sugars and much fat. Reduce liquids to two or three pints daily and take very little with meals. The whole diet should be reduced to the minimum needed to maintain good nutrition and strength.

BENEFICIAL.	DETRIMENTAL
Soup.—Small cup bouillon or clear soup at dinner. *Fish.*—Fresh fish except those containing much fatty matter, preferably boiled.	Soups, except as above, salmon, bluefish, eels, salt fish, pork, veal, sausage, made dishes, fats, potatoes, macaroni, oatmeal, hominy, spices, rice, beets, carrots, turnips, parsnips, puddings, pies,

Meats.—Lean beef, mutton or lamb, chicken, all sparingly.

Eggs.—Boiled or poached on toast.

Farinaceous.—Stale bread, dry toast, sparingly.

Vegetables.—Spinach, asparagus, cauliflower, onions, white cabbage, celery, tomatoes, radishes, olives, lettuce, cresses.

Desserts.—Jellies made with gelatin.

Fruits.—Fresh ripe fruits—acid fruits preferable.

Fluids.—At meals one cup tea or coffee, without milk, cream or sugar, or one glass pure water sipped at end of meal. Hot water freely between meals.

pastry, cakes, sugars, sweets, milk, cream, malt or spirituous liquors, beers, sweet wines, champagne.

PHTHISIS (Consumption).

General Rules.—

BENEFICIAL.

Soups.—Turtle soup, oyster soup, clam or chicken broth, puree of barley, rice, peas, beans, cream of celery or tomato, whole beef tea, peptonised milk gruel.

Fish.—All kinds of fresh fish, boiled, broiled or baked, oysters and clams raw (soft portions), also roasted or steamed or broiled.

Meats.—Rare roast beef or mutton, lamb chops, tender steaks, hamburger steak (rare), ham, fat bacon, sweetbread, poultry, raw pulped mutton or beef (scraped, pounded, put through sieve), or meat juice from slightly broiled steak.

Eggs.—Raw, soft-boiled, poached, any way acceptable except fried or hard boiled.

Farinaceous.—Oatmeal, wheaten grits, cornmeal mush, hominy, rice, with milk or cream, whole wheat bread, corn bread, milk toast, biscuits, muffins, gems, etc.

Vegetables.—Nearly all if non-irritating, potatoes, baked, boiled, creamed, fresh green peas, beans, spinach, onions, asparagus, tomatoes, all well-cooked, preferably steamed to avoid loss of salts in boiling, lettuce, celery. Cream butter,

DETRIMENTAL

Fried foods, salt fish, hashes, gravies, highly seasoned dishes, veal, pork, carrots, parsnips, cabbage, beets, turnips, cucumbers, macaroni, spaghetti, sweets, pies, pastry, sweet wines.

best olive oil may be used freely if agreeable.

Desserts.—Farina, sago, tapioca, plain or as simple puddings, floating islands, custards, baked or stewed apples with fresh cream, rice with cream, cooked fruits.

Fruits.—Fresh ripe fruits as desserts, or taken in morning or early part of the day, oranges, grapes, peaches, pears, etc.

Fluids.—Fresh milk, freely, sipped slowly, taken plain, peptonised, with cream added, with carbonated water, buttermilk, Bulgarian sour milk, cocoa, tea, coffee, lemonade, orange juice, pure water, Panopepton, Panopepton and whey, Laibose.

PREGNANCY.

General Rules.—

BENEFICIAL.	DETRIMENTAL
Soups.—Broths of mutton, chicken, oysters and clams, fish, when it agrees, raw oysters, raw clams. *Meats.*—Beef, mutton, chicken, game, eggs, butter, fat, sweetbreads, ham. *Breadstuffs, etc.*—Good wheat bread, corn bread, oatmeal, wheaten grits, rice. *Vegetables and Fruits.*—Baked potatoes, spinach, macaroni, greens, cresses, celery, green peas, lettuce, asparagus, green corn, oranges, grapes, stewed fruit. *Drinks.*—Water freely, cocoa, milk, tea, coffee. *Desserts.*—None but the plainest. *Nursing Women.*—During the first three or four days after delivery the diet should consist of liquid food made of cereal grains, with a small allowance of animal broths. After the bowels have been thoroughly opened, begin to resume the normal diet. Allow tender beef, mutton, chicken or game once a day, with baked potatoes and green vegetables. Wine, jelly, blanc mange and simple custards should constitute the desserts. At the end of ten days the	Pork, veal, indigestible meats, stews, gravies, made dishes, rich desserts, pastries, etc., coffee, stimulants, acid fruits.

regular meals should be given, consisting of the most nutritious and digestible substances. Cocoa and chocolate may be used.

PNEUMONIA.

Food must be carefully administered from the beginning without waiting for depression to come on. Beef juice, milk, milk-punch, egg-nogg, wine-whey, mutton or chicken broth, liquid peptonoids should be given systematically every three hours. In weak subjects stimulants are necessary from the onset.

RICKETS.

Good cow's milk, diluted by one-third to one-fourth of lime-water is the most suitable food. In older children the food should contain an abundance of animal fat, nitrogenous principles, and salt. The quantity of animal fat should amount to at least one-fourth of all the solid food taken, the nitrogenous food to one-third, and the starches to one-third. The fat is best administered in the form of cream or rich milk, but if this cannot be obtained cod-liver oil may be substituted. Raw or beef cooked very rare is one of the best articles of food in this disease for older children.

RHEUMATISM.

General Rules.—Avoid eating much meat. Drink plenty of water.

BENEFICIAL.	DETRIMENTAL
Soups.—Light broths in small quantities, of mutton, chicken, beef, oyster or clam broth, preferably without the oysters or clams. *Fish.*—Fresh fish (whiter kinds), boiled, raw oysters, clams. *Eggs.*—Soft-boiled, poached. *Meats.*—The lighter kinds, chicken, sweetbread, calf's head, tripe, fat bacon, boiled ham, all sparingly. *Farinaceous.*—Whole wheat, corn or brown bread, arrowroot, rice, dry toast, milk toast. *Vegetables.*—The more digestible kinds, well-baked potato, well-cooked spinach, stewed celery, green peas, cabbage (well-boiled), lettuce.	Pork, veal, turkey, goose, duck, fried fish or meats, cooked oysters or clams, salted, dried, potted or preserved fish or meats (except fat bacon or ham), crabs, salmon, lobster, rich made dishes, gravies, meat extracts, tomatoes, beans, asparagus, mushrooms, candies, rich puddings, pies, pastry, nuts, cheese, coffee, cider, malt liquors, wines.

Desserts.—Simple puddings of rice or arrowroot with milk (no sugar), junket.

Fruits.—Fresh ripe fruits, stewed fruits without sugar.

Fluids.—Tea (without sugar), buttermilk, pure water, plain, or with lemon or lime juice, milk between meals, plain or peptonised, Bulgarian sour milk.

URIC ACID DIATHESIS.

Lithemia, Reno-Vesical Calculi.

General Rules.—

BENEFICIAL.

Soups.—Light soups from bone or bone marrow, clear vegetable broths.

Fish.—The whiter kinds of fresh fish, boiled, broiled, baked, soft portions of oysters and clams, *all restricted.*

Meats.—Beef steak freed from fat and connective tissue, fresh beef, lamb, mutton, chicken, boiled, broiled, roasted, bacon, *all restricted.*

Eggs.—Soft boiled, poached, prepared with milk, cream, butter or with cheese.

Farinaceous.—Cracked wheat, oatmeal, hominy, rice, sago, with milk or cream, macaroni, whole wheat, rye or graham bread, crackers, dry toast, butter sparingly.

Vegetables.—Nearly all fresh vegetables, peas, beans, spinach, cabbage, cauliflower, onion thoroughly boiled, asparagus, potato, celery, lettuce, light salads with oil and vinegar or lemon juice.

Desserts.—Light plain puddings, light fruit puddings, or with sauces of fruit juice, rice, sago and milk, junket, stewed fruits, baked apples, fresh ripe fruits (sometimes better taken in early part of day), nuts, almonds, figs, dates, honey, jelly, fresh cheese.

Fluids.—Tea, coffee, cocoa, *all restricted,* milk, plain, peptonised, skimmed, or with carbonic waters, buttermilk, Bulgarian sour milk, cream, toast water, pure water, cold or hot, fruit juices (unfermented), from grapes, apples, raspberries. Alkaline mineral waters, waters containing potassium or lithium salts, calcium carbonate, etc., as directed by physicians.

DETRIMENTAL.

Liver, sweetbread, veal, pork, goose, duck, turkey, dried, potted or preserved fish or meat, crabs, lobster, salmon, rich soups, meat broths, meat extracts, meat gravies, fried food, pastry, hot breads, confectionery, sweet potatoes, mushrooms, pickles, mustard, pepper, paprika, curry, horse-radish, parsley, rich puddings, heavy cheese, malt liquors, sweet wines, champagne.

VEGETABLE DIET

A vegetable diet, or vegetarian diet, in the the true sense of the word, is one that not only does not include meat, but does not even include such animal products as milk, butter, cheese and eggs. Even in the strict application of the term, such a diet commonly includes not only vegetables but all cereals, fruits, nuts and green food. As a matter of actual practice, however, such restrictions in diet are seldom observed and the "vegetarians" usually restrict themselves only in avoiding flesh, fish and fowl. In many instances they really depend very largely upon the use of eggs, milk and milk products to take the place of meat, and especially to supply the protein which gives meat its chief value.

There is no question that life, health and strength can be maintained on a meatless diet, and it is interesting to note that millions of people, especially in Asia, actually do live on a vegetarian diet, either exclusively or nearly so. The vegetarian diet is naturally a clean diet, and when satisfactorily balanced so as to supply all of the food elements required by the body is frequently found to be conducive to endurance. Many athletes have shown superior powers of endurance when on this diet, including Marathon runners, professional boxers and wrestlers, but at the same time it cannot be said that a vegetarian diet is always to be advised for the average man, inasmuch as it is most important that one should have a thorough knowledge of food values in order to make such a selection of foods as will provide perfect nutrition. Those who lose strength or weight on a vegetarian diet usually do so because they do not know how to find substitutes for meat.

The chief defect of a strict vegetable or vegetarian diet is its comparative lack of protein, which, of course, is supplied liberally by the meat and fish in the ordinary diet. (See Table of Food Values, page 1215.) Most vegetables contain a large percentage of water and considerable starch, but very little or no protein. They are valuable, however, for the ash or organic mineral salts which they contain. Fruits also contain very little protein. A diet of vegetables and fruits alone, therefore, would be inadequate to sustain life and energy for any length of time. The grains, however, especially wheat, rye and oats, contain a fair percentage of protein, and one can practically live on these alone, if necessary, though such a diet would be monotonous and probably less conducive to energy than a mixed diet that includes a good variety. Cereals, however, naturally form an important part of a vegetarian diet, although it appears that in the case of white flour a considerable part of the protein of the wheat has been lost in the process of milling.

Nuts are rich in both protein and fats and therefore make a splendid substitute for meat. Like fruits, they are eaten uncooked or in their "natural" state. Some vegetarian theorists even advocate a "back to nature" life, in which one would be supposed to live on an exclusive diet of nuts and fruits. In some cases, however, nuts are found hard to digest, especially if the digestion is weak.

Among the vegetables an exception to the rule is found in the legumes,

including peas, beans and lentils. These have a high percentage of protein, especially in their ripened or dried condition, and make a very good substitute for meat. The familiar baked beans, therefore, have a real strength building value. Peanuts should properly be classed with the legumes, for they do not strictly belong to the family of nuts.

It will be seen from the above that a strict vegetarian diet offers a comparatively limited supply of protein, which may be regarded as the building material for the muscles and various other tissues of the body, but does supply freely the energy and heat-producing elements, particularly the carbohydrates, starch and sugar. Most vegetarians, therefore, use eggs, milk and cheese to a considerable extent to supply the protein. If properly balanced in this way this diet is usually satisfactory. One may, of course, secure sufficient protein on a strict vegetarian diet by using plenty of nuts, beans, peas and lentils and the products of whole wheat, rye and oats. According to the best opinion on the subject, however, the animal proteins are more easily digested and assimilated. One secures energy from the animal foods with less expenditure of energy in the process of digestion.

There are certain conditions in which a vegetarian diet is especially valuable, though it is usually best to follow any strict diet of this kind for only a limited time. Where there is rheumatism, disease of the thyroid gland, Bright's disease, or any other disorder due to excessive accumulations of uric acid or difficulty in the assimilation of protein it is well to use very little or no meat. A strict diet of fruit or of vegetables in such cases may frequently be found to have good results.

Vegetables and fruits are especially valuable for their supply of the mineral salts. These are needed only in small quantities, but in these quantities they are absolutely essential and when the diet is deficient in this respect serious conditions arise. It is now held by many investigators that such diseases as scurvy, beri-beri and pellagra are chiefly due to starvation in respect to these particular elements, and are curable by the free use of fresh vegetables and fruits containing these organic salts in abundance. Green salads are extremely valuable on this account. In order to preserve the mineral salts in the cooking of vegetables it is important that the water should not be thrown away, for the salts are largely dissolved in the boiling water and then lost in the process of draining. Very little water should be used in cooking, boiling slowly or steaming, and this liquid should be served with the vegetables.

All foods should be used, as nearly as possible, in their natural form in order to secure these organic salts. Whole wheat flour should be used instead of white flour; unpolished, natural rice instead of polished rice; brown sugar in place of white sugar. The refinement of food, while making it more attractive in appearance, invariably robs it of much of its nutritious character. When using a vegetarian diet it is especially important to consider these requirements.

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THE SICK ROOM IN THE HOME

PART IV.

HEALTH AND CARE OF THE AGED.

Preservation of Health.—The preservation of health is sought by all wise persons, and the sweeping advances made by medicine in the past century, together with the better understanding of the masses, makes it possible to lessen disease, to minimize its evil effects, and to preserve the separate organs from involvement.

Patients Must Assist.—An educated physician has wonderful powers, but he can use but half his knowledge if he has no assistance from the patient or the patient's family. The physician recommends certain foods and advises against certain habits. An intelligent man will follow this advice to the letter. As regards many conditions, the reader can find ample advice in these pages.

Moderation.—All through life one word sums up the rule which all should heed. That word is moderation.

Temperance is almost a synonym.

Be temperate in food as well as in drink; in exercise and in work; even in sleep and rest, moderation is the word.

Effects of Immoderation.—Too much meat, too much pastry, too much tea or coffee, too little sleep, too heavy work and the blood is surcharged with deleterious material which is deposited in the various organs and tissues of the body and premature old age comes on, or the organs fail to functionate, and death comes years ahead of its time. Even in acute illnesses which are determined in their course in the first few days of the disease, constitution plays a most important part. This constitution may be inherited—a cause for congratulation—or it may be acquired.

Healthy Ancestry.—To obtain a good physique one should have healthy ancestors. For this purpose—to insure as healthy an ancestry as possible to coming generations—the most intelligent men of our times are agitating the passage and enforcement of laws prohibiting the marriage of the physically or mentally unsound.

Inherited Consumption.—Consumptives should not marry, or if they marry, should not create or bear children to inherit the weakened constitutions and to look forward to the same early and revolting death that their parents have had.

Care in Inherited Consumption.—If, on the other hand, such a family

history has preceded one's advent into this world, attention to every detail in the development of the body and to maintaining that condition of health which results, will usually lengthen the days and the reward will be worth all the struggle and effort. Climate, an outside life, temperance in all things, and the careful trial and development of the weakened parts of the body are essential to improvement.

Criminals Should not Have Children.—That criminals should not create offspring is most widely accepted. How to prevent this is the question that has excited discussion for several decades among learned men. That the vast majority of our criminals are the children of other criminals is acknowledged.

Children of Criminals.—A large number of their children are epileptics or idiots. With this horde of "misfits" in the community, there is a constant drag backward on the wheels of progress. Emasculation is the remedy most certain, and is offered by the most enlightened and advanced men in the world, but few among the masses are prepared to accept so severe a measure. Many people fail even in this day to realize that duty to mankind is above duty to individual man.

Cleansing the World of Disease.—The above paragraphs—on consumption and on criminals—are but hints to the thinking, and if followed to their natural conclusion will demonstrate the necessity of cleansing the world of disease by allowing those who are afflicted to live out their lives as comfortably and as happily as they can, only prohibiting them from perpetuating their kind, which they should have no desire to do anyway if they realize the sort of offspring that will surely be given them.

Care in Different Stages of Life.—In the third decade of life many excesses in work or in dissipation may be indulged in without any immediate ill resulting, but the fourth or at latest the fifth decade will show that all excesses must be paid for to the full. I do not mean to encourage laziness, for activity in business and in pleasure are as useful as can be.

Value of Recreation.—Vacations are a help and should be spent away from one's work and among new and novel scenes. Recreation from work and worry helps to lengthen one's days. Brain workers especially must throw off completely all thoughts of their work at frequent intervals and refresh their minds, and thus their bodies, with new or entirely different occupations. The return to work will reveal an increased power and interest.

Value of Sports.—Golf, hunting, fishing, and the various simpler sports are of value to a mature man or woman, acting both mentally and physi-

cally toward the well-being of the individual. No one should consider themselves old so long as they can possibly enjoy the milder sports of life. Some men are young at seventy—yes, even at eighty—while some are old at sixty. "A man is as old as his arteries," says someone, and it is true that some men are older at thirty than others are at fifty.

Avoid Worrying.—Don't worry. It ages yourself and all your friends. A woman who thinks herself a compact bundle of symptoms looks old, is old, but unfortunately does not die soon enough to allow her friends to enjoy a little youth.

THE AGED.

Prolonging Life.—In older times the alchemists claimed to have discovered the elixir of life. They said that old age might be retarded and life greatly prolonged by means of an elixir having the power of preventing or suspending physical decay.

The possibility of prolonging life has in all ages been noticed by great thinkers.

The Organs in Old Age.—The latest scientific knowledge in regard to this subject may be stated as follows: The principal characteristics of old age, as demonstrated by anatomical research, are a deposition of fibrinous, gelatinous, and earthy material in the system. Every organ of the body, during old age, is especially prone to ossific deposits. The earthy deposits have been found to consist primarily of phosphates and carbonates of lime combined with other calcareous salts.

Bone Hardening in Old Age.—Man begins in a gelatinous and ends in an osseous or bony condition. From the cradle to the grave a gradual process of ossification is undoubtedly present; but after passing middle age the ossific tendency becomes more markedly developed until it finally ushers in senile decrepitude. These earthy deposits during old age materially interfere with the due performance of function by the organs; hence we find imperfect circulation in the aged; the heart gradually becomes ossified; the large blood-vessels blocked up with calcareous matter, and nutrition hindered.

Changes Which Produce Old Age.—"If repair was always equal to waste, life would only terminate by accident." It is the opinion of eminent scientists that the majority of all who pass sixty-five years suffer more or less from these ossific deposits. Therefore, bearing these facts in mind, it is plain that the real change which produces old age is, in truth, nothing more nor less than a slow but steady accumulation of calcareous matter

throughout the system; and it is owing to these deposits that the structure of every organ is altered, elasticity thus giving way to senile rigidity. Blockage of various organs is thus commenced, and sooner or later a vital part becomes involved, and death of necessity follows. The idea that old age was brought about simply, or at all, by a decline of the vital principle, has long since been discarded by scientists, and the true cause found to be that of gradual disintegration of the tissues because of the inadequate supply of blood.

The feebleness of old age, therefore, being due to nothing more nor less than ossific deposits, it is well for a moment to look for the causes and influences leading to the condition described.

THE CAUSES OF OLD AGE AND THEIR AVOIDANCE.

The two principal causes of old age are, first, fibrinous and gelatinous substances; and second, calcareous deposits. According to recent researches, the origin of the first, the fibrinous and gelatinous, may undoubtedly be traced to the destruction of atmospheric oxygen.

Fibrin Blockades Life.—Although unquestionably fibrin nourishes the organs of our body, yet it becomes at times, as we reach the cool and shady walks in the evening of life, accumulated in redundant quantity, blockading the streams of life as do the chilling winds of winter the mountain rivulets.

Proportion of Chalky Matter.—The calcareous deposits are proved to be caused by gradual deposition from the water which forms so large a part (70 per cent.) of the human system, and to be introduced by means of food.

Foods and Chalky Matter.—As a matter of fact, everything we eat does contain these calcareous matters to a greater or less degree. The cereals are found most rich in them; so bread itself, the so-called staff of life, except in great moderation, most assuredly favors the deposition of these salts in the system. The more nitrogenous our food, the greater its percentage of calcareous matter; thus a diet composed principally of fruit, from its lack of nitrogen, is best adapted for preventing or suspending ossification.

Effects of Overeating.—Moderation in eating, then, must ever be of great value as an agent for retarding the advent of senile decay. Large eaters more rapidly bring on ossific deposits by taking in more than is

utilized or excreted, naturally resulting in blockading the vessels and destroying their normal functions.

Best Foods for the Aged.—According to the best authorities, the following seem to be the best articles of food as containing the least of earthy salts: Fruit, fish, poultry, flesh of young mutton and beef; because, as before stated, they are much less nitrogenous. Fluids, as part of the diet, are of special import. All well and spring water contains considerable of the earthy salts, and should therefore be avoided and cistern water used in its stead, because water is the most universal solvent known.

How to Dissolve Salts.—Therefore, if when taken into the system clear of foreign matter, it is to that extent the better prepared to dissolve and take up those earthy salts and convey them out of the system. The addition of fifteen or twenty drops of dilute phosphoric acid to the glass of water, and drunk three times a day, will add to the solubility of these earthy salts.

RULES FOR THE CARE OF THE AGED.

1. The aged should not endeavor to perform the feats of agility, strength, endurance, and "of digestion," which were once their pride, especially during the extreme heat of summer.

2. The aged should avoid torpor of the bowels and constipation. Straining at stool may cause apoplexy.

3. Do not give up all mental and bodily work.

4. In the chill of any evening, or of early autumn, the aged need fire. Many an otherwise long life is cut short from neglect of this rule, by an attack of some form of lung inflammation.

5. Life can be prolonged, without a doubt, by a proper change of climate and of scene. The flickering flame of life can be protected from going out by a careful hand.

6. All warnings of weakness, or oncoming sickness, or decay, should at once be noticed by the aged, and due precaution and proper treatment instituted at once.

FOOD IN OLD AGE.

What Food to Avoid.—We eat to live or should eat to that purpose, and as one grows old there is all the greater demand from Mother Nature that we adhere to this rule. Sir H. Thompson, in his book on Diet in Relation to Age and Activity, says that if a man past his half century of life "continues to consume the same abundant breakfasts, substantial lunches and heavy dinners which at the summit of his power he could dispose of

almost with impunity, he will in time either accumulate fat or become acquainted with gout or rheumatism, or show signs of unhealthy deposit of some kind in some part of the body-processes which must inevitably empoison, undermine, or shorten his remaining term of life. . . . . The typical man of eighty or ninety years is lean and spare and lives on slender rations."

Three Diet Rules.—Prof. W. Gilman Thompson, M.D., of New York, in his classic work on dietetics gives three rules to be observed in the dietetic treatment of old age. These are:

"1. To diminish the total quantity of food ingested.

"2. To give food at frequent intervals in small amounts.

"3. To give only digestible food, which does not produce too large a residue of waste mater, either in the intestinal canal or in the form of excrementitious material in the blood."

A Nature Hint.—Meats and tough vegetables are to be avoided and Mother Nature gives us a hint of this by taking away our teeth. This does not mean that the aged are to be kept on a fluid diet, for mastication is of use in promoting the salivary flow.

Liquid Tonic.—"Malt liquors are very good for the aged, and a moderate amount of alcohol acts as a tonic and supplies them with needed energy for digestion and other functions."

Minced Foods.—Yeo's suggestions as to diet in the aged are worthy of quoting in full:

"Of animal foods best suited for this time of life the following may be mentioned. When the organs of mastication are altogether inefficient these foods should be minced or pounded into a paste or otherwise finely subdivided:

List of Foods for the Aged.—"1. Young and tender chicken and game and other meats.

"2. Potted chicken, game and other meats, sweetbread.

"3. White fish, as soles, whiting, smelts, flounders, and so forth. Best when broiled.

"4. Bacon, grilled; eggs lightly cooked or beaten up with milk, and so forth.

"5. Nutritious soups, such as chicken purees, or fish purees, beef tea, mutton and chicken broths.

"6. Milk in all forms, when easily digested.

"7. Beef tea and milk supply the needed mineral substances, and the former is an excellent stimulant.

"8. The addition to milk of an equal quantity of Vichy water, warm, or of warm water, will often help to make it agree.

Vegetable Food.—"1. Of vegetable foods the following are all suitable.

"2. Bread and milk made with the crumbs of stale bread and without any lumps.

"3. Porridge and oatmeal gruel.

"4. Puddings of ground rice, tapioca, arrow-root, sago macaroni with milk or eggs and flavored with some warm spices, or served with fruit juice or jelly; bread and butter, at least a day old; rusks for soaking in tea, or milk, or water.

Artificial Foods.—"1. Artificial foods, consisting of predigested starches. The digestive ferments are scantily provided by the digestive organs at this age, and soluble carbohydrates are valuable for maintaining the body heat.

"2. All farinaceous foods should be submitted to a high temperature for some time so as to render the starch granules more easy of digestion.

"3. Vegetable purees of all kinds may be taken in moderation—*e. g.*, potatoes, carrots, spinach and other succulent vegetables.

"4. It is important that the use of potatoes and fresh vegetables should not be neglected; otherwise a scorbutic state of the body may be engendered.

"5. Stewed celery and stewed Spanish or Portugal onions.

"6. Stewed or baked fruits and fruit jellies and the pulp of perfectly ripe raw fruits in small quantity.

Counteracting Acidity.—"The acidity of certain stewed fruits may be advantageously neutralized by the addition of a little bicarbonate of soda so as to avoid the use of a large quantity of cane sugar to sweeten it, as this is apt to cause gastric fermentation and acidity. In stewing fruit about as much soda as will cover a shilling should be added to each pound of fruit.

Use of Condiments.—"Aged persons often require their foods to be accompanied with some kind of condiment, which promotes their digestion and prevents flatulence.

"Caviare and the roes of smoked and salted herrings are of this nature.

Sweetenings.—"For sweetening food milk sugar is much less prone to excite acid fermentation than cane sugar.

Digestible Form of Fat.—"A very digestible form of fat, when it is

needed, is cream mixed with an equal quantity of hot water and about ten drops of sal volatile to each fluid ounce."

General Diet Required.—It is but fair to all concerned that I submit the teachings of Dr. J. Boy-Teissier, of Marseilles, who, in the most recent and complete work on this subject, handles the theme and the patient in a different manner entirely. As to diet, he says: "I do not think that a special diet is necessary. We must not forget that the normal old man is not a patient; all the functions of the adult exist also in the old man, only in a diminished degree; the functions are the same, but their activity only is lessened. . . . We must regulate the quantity of food and adapt it to the degree of senilization. . . . . It is useless and even dangerous in the case of old people to try to maintain the strength at high point by means of alimentation.

A Diet of Maintenance.—"In a general way, having no longer an active life to lead, the old man has need merely of a diet of maintenance . . . watch . . . over the performance of the excretory functions; as long as the weight does not vary, and as long as the urea represents the quantity of nitrogen contained in the food we may regard it as certain that there is a perfect equilibrium and that the alimentation of the old man is sufficient."

Cautious Use of Wines.—Boy-Teissier does not subscribe to the saying that wine is the milk of the aged, but advises great caution in its use.

The Aged Should not House Themselves.—This same author advocates plenty of fresh air for the normal old man. So many old people house themselves up and shut out from their blood the pure air which they need even more in their old age than when younger. If diseases of the lungs forbid exposure, heed should be given, but the normal old person should have fresh air, and also all the sunshine he can get.

Clothing of the Aged.—The clothing should not be heavy, but rather light. It should, however, be warm and comfortable. Bundling should be avoided in the latter days as in all the other days of life. The warmest place in the chimney has always been reserved for the grandparent, but this is a mistaken kindness, for it only increases his tendency to inaction.

Muscular Exercise.—To counterbalance this tendency to inaction, which means a retarding of the combustion of the products of nutrition, muscular exercise should be insisted upon. Care should be had lest this be overdone, but the old man should be forced to exercise.

Medical Care.—I have written here of normal old age, and it is the

old age we all look forward to. Few attain it and those who grow old with some organs of the body more advanced in the aging process than others, find that they need almost constant medical supervision to help them live longer and to be more comfortable while they live.

Natural Death.—"Above all modes of dying is that which we must call natural death, physiological death, that which necessarily and happily terminates existence. This death is gentle and calm, for it is free from all painful manifestations; it is, therefore, desirable, and all our efforts ought to be directed to its attainment. We should try to have it accepted as a happy event. . . . I have not to occupy myself with the value of life. Most commonly, I believe, it is worth only what we make it worth.

When Death is Welcome.—"But after having seen that all the vital phenomena have fulfilled their evolution, we may justly believe that this final act, that which is accomplished naturally, without our having had any responsibility in its hastening or retardation, that which terminates the series of organic acts, ought to be regarded as welcome."—*Boy-Teissier.*

CARE OF THE EYES.

To take proper care of the eyes is to do all we can to avoid such diseases as are avoidable. To do this we should know something about the eye and its diseases, descriptions of which have been given in Book IV—Part IV.

Near-Sightedness.—Boys often discover their near-sightedness by finding that their playmates can read signs and see clocks and faces at much greater distances than they can. Near-sightedness is a growing defect among young people and may be corrected in part by looking at distant objects in the heaven or on the ocean.

Weak Sight.—Fatigue of the eyes during or after the use of them is the first symptom of weak sight. This is more noticeable at first after reading, writing or sewing in the evening; soon the same fatigue is noticed after similar occupation in daytime. In time this fatigue comes on immediately after attempting to read or sew, and, if work is continued, pain and confusion of vision follow; letters run together, lines are blurred and indistinct. Weak sight is simply a disorder of the muscular apparatus of the eyes.

There are four striking symptoms by which we may judge that the eyes are being injured:

1. Redness of the eyelids and eyeballs.

2. Pain in the eyes.

3. Indistinct or imperfect vision.

4. Frontal or other headaches.

In health the muscles act in perfect harmony, but if these muscles are overworked, fatigued or sensitive they do not act harmoniously, and weak sight is the result.

Never Use Imperfect Light.—Never use an imperfect light. What is an imperfect light?

1. Deficient amount of light, as in the early morning or twilight, or an artificial light far distant, or a very small artificial light, or light far from a window which is too small for the room and for a dark day. When the light is such as to render it difficult to see the work or print before us a proper regard for the preservation of vision will compel the immediate stopping of the work.

2. Light may be imperfect from its unsteadiness. It is this quality that renders the electric light harmful to vision. Gas light often exhibits a degree of flickering very trying to the eyes.

3. The light may be steady but the car or carriage in which we are seated may move. The attempt to read in the cars is a fruitful source of injury to the eyes.

4. The practice of reading while in a reclining position upon a lounge or in a bed causes the light to enter the eye at such an angle as to require an undue amount of effort in order to see distinctly for a long time. Such a position should always be avoided.

When possible the light should fall upon the printed page or upon our work from the left side of the body and from behind the shoulders.

How to Preserve Good Sight.—1. Act as if the eyesight were of more importance than any other thing on earth.

2. Have your child's eyes carefully examined by an expert before it is given specific tasks to perform calling for the full exercise of healthy eyes. If the eyes are found defective then grade the tasks according to the nature of the defect.

3. Never use the eyes when such use causes pain in these organs or in the head.

4. Never use the eyes when imperfectly supplied with blood, as before breakfast, when exhausted after a severe illness, and so forth.

5. Never use the eyes for close work in an imperfect light.

6. Avoid the excessive use of alcohol and tobacco.

7. Heed the warning given by redness of the eyelids and of the whites

of the eyes; by pain in or about the eye; by the continuance of indistinct vision for any considerable time.

8. Regard the eyes as part of a very complex system of apparatuses, the best health of all being absolutely needful for the best health of each.

9. Remember that we do not see with the eye, but with the brain. Hence after the brain is exhausted it is impossible to really see.

Use of Spectacles and Eye-Glasses.—Weak sight is very often due to defective form of the eyeball itself, it being too flat, too full, or of irregular form. In cases of defective eyeballs, beside following the advice given above, the imperfect shape must be neutralized by the scientific adaptation of spectacles. It is quite wrong to depend upon your own judgment in this matter or to procure your glasses from a traveling peddler of spectacles. For elderly people, spectacles are usually preferred to eyeglasses, except for occasional use. For long use spectacles are more comfortable.

Blue or smoked glasses in weak sight, when there is much dread of light. Their use should be confined chiefly to wear in bright sunlight on the snow, sand or water. For reading, colored glasses should not be too dark in tint, as too much exertion is required to see clearly through them.

Contagious Eye Diseases.—It should be borne in mind that diseases of the lids or eyes attended with a pus discharge are contagious. Those suffering with such a disease should be kept apart from others and great attention should be paid to cleanliness. Towels and washing material should not be used in common.

Common Eye Accidents.—Those who work where splinters of metal or stone are liable to strike the eye should wear spectacles at their work. Spectacles of ordinary glass are a good protection against cinders in traveling. Eye-stones are nothing but smoothly-worn pebbles. It is not best to use them. It is not common-sense treatment to cure an irritable eye, suffering from a foreign body, by placing another foreign body therein.

Removing Cinders.—A cinder or other foreign body may often be displaced by quietly and steadily looking downward at your feet, letting the tears that form wash out the irritating substance. If the foreign body sticks on the ball it sometimes can be readily wiped off with a piece of paper twisted to a lamp-lighter shape or the free end of a common match. If it does not come off easily professional aid must be secured as great harm may be done the beautiful, transparent front of the eye by the use of sharp instruments in unskilled hands.

If quick-lime or mortar has fallen into the eyes, the best plan is to

drop in some olive oil at once. The eye then may be washed out with warm water to wash away all the particles of lime. This can be best done with a small syringe. If acid has gotten into the eyes use milk and water at once and in the same manner.

CARE OF THE EAR.

Prime Rules.—1. Act as if hearing were of more importance than any other thing on earth.

2. Refrain from use of the ear when it causes pain, choosing quiet places and deadening sound by the use of cotton plugs.

3. Avoid all such injuries to the ears as result from slapping, pulling, and very loud and sudden noises.

4. Keep out of the external ear all things smaller than the forefinger, or stiffer than a towel or handkerchief.

5. Keep out of the ear all oils, all soaps, all cold water and everything else recommended by kind but mistaken friends; especially never apply a poultice to the ear for the relief of pain. Dry heat will do all that moist heat can do to relieve and be free from the danger of absolutely destroying the drum of the ear.

Cleansing the Ear.—In health, the deeper parts of the ear can be left to take care of themselves. The orifice of the canal is to be cleansed in precisely the same manner as any other depressed portion of the surface of the body—that is, with a wet sponge or cloth.

CARE OF THE SKIN.

Every-day Washing.—Every-day washing should be the rule the year round, but particularly so in summer. Ablution of the person sufficient for cleanliness may easily be made to act also as a proper stimulant by using a rapid sponge bath, followed by quick rubbing for a few moments with a towel of such texture as can be borne without irritation. The skin will not bear the frictions of a lintish towel so well in summer as in winter. Invalids should avoid chilling the body; simple and generally healthful as bathing is, it cannot be trifled with. Many a good man or woman has unwittingly committed suicide with water.

Daily Attention to Feet.—If the person is very feeble and very sensitive to the application of water such an one can attend to one part of the body one day and another the next. It is well, however, to give daily attention to the feet. The feet perform a large part of our bodily labor, and

the excretion from them is so great that particular care should be taken to keep them clean. Warm sponging followed by friction is more suitable for cleansing the skin of dirt and for the delicate invalid and child.

Use of Soap.—The amount of soap used in the toilet depends upon the delicacy of the skin and the exposure to which it has been subjected. Those who have oily skins depending upon well-developed and active oil-glands require much more soap than those having harsh and dry skins lacking in oily secretion.

Cautious Use of Soap.—Daily application of soap to the face is not necessary unless one is exposed to considerable dust and dirt. Hot water and a coarse washrag with thorough rubbing and followed by cold water and more thorough rubbing will stimulate the skin and make it healthier than the excessive use of soap to remove invisible dirt. Many cases of "black-heads" and postular eruptions of the face have been benefited by stopping the use of soap on the face.

Removing Face-Shine.—Clean fine white velvet is an elegant substitute for powders to remove the shine on the face. Chamois skin is used for the same purpose.

Cosmetics.—Cosmetics are substances applied to the skin, hair, teeth, nails, and so forth, to improve their appearance. None of them are essential to health; the great majority are positively harmful. Health and strength give the beauty that is appreciated by all men and women of refinement.

CARE OF THE HAIR.

Attention to the Scalp.—The preservation of the hair depends upon a number of things, and chief of these is the condition of the scalp which is the soil in this case. The scalp should be thick and movable and massage will help to develop this part of the body as it does other parts. So shampooing does double duty, cleansing and massaging. The brush does the same work in a different way and neither should be neglected.

Cleansing the Hair.—Cleanliness is the first requisite in the management of the hair. There is no danger that the scalp will be washed too often. Shampooing should be done as often as the hair is dirty. At least once a month the head should be thoroughly washed and the hairs cleaned down to their roots. Any good soap may be used, but there is not one that is purer than the white castile. Tincture of green soap is a reliable and satisfactory soap.

Brushing the Hair.—The hair should be brushed several times a day,

at least in the morning and evening, and for several minutes at each time, until there is a feeling of warmth in the scalp. Adults should use a stiff brust and children or those with thin hair or a tender scalp a soft brush. Never brush hard enough to make the head sore.

Good Combs.—Combs should be preferably coarse and used to disentangle the hair, not to cleanse it. The teeth should be well made and not ragged, as they will then tear and pull out the hair. Never try to comb dandruff out of the hair. It should be brushed out or washed out.

Crimping.—Crimping the hair causes it to break and crack. This may be a matter of considerable importance in elderly women in whom the hair is beginning to fall and thin out, for this will hasten the fall and cause more or less baldness.

Grayness.—Women usually preserve the color of the hair longer than men. Fair hair falls out sooner than black, but does not become gray so soon. Premature grayness of the hair is often produced by debility, anxiety or severe illness.

Baldness.—If from any cause the hair papilla becomes diseased or debilitated it either ceases to produce the hair or each successive hair becomes shorter, finer and more brief in its life, until, finally, atrophy of the hair follicles occurs and the hair is dead. Under ordinary circumstances the hair of the head begins to thin out between the ages of thirty and forty and this thinning proceeds slowly but steadily during the rest of the individual's life. Those who are affected with dandruff should pay immediate attention to the condition, otherwise the hair will begin to fall out and baldness result. Baldness can occur without the occurrence of dandruff, and, again, the hair remains thick and strong in some persons whose heads are full of dandruff. The baldness occurring in connection with fevers, skin diseases of the scalp, and so forth, is only temporary; the bulbs are not destroyed and the hair is again reproduced. In elderly persons, after sickness, the hair may not return to its full former condition.

Hair Invigorators.—When the falling of the hair has been caused by some fever or other illness the remedies used for relief are stimulants—something to increase the blood supply to the scalp. These are called hair invigorators. We would caution the reader against the use of all patent, advertised hair remedies. A simple and harmless "invigorator" is as follows:

Formula for a Good Hair Invigorator.—

Cologne water	2 ounces
Tincture of cantharides	2 drachms
Oil of lavender	10 drops
Oil of rosemary	10 drops

Use once or twice a day. If it makes the scalp a little sore, discontinue its use for a short time.

To Cleanse Hair of Dandruff.—Rub in well the yolk of an egg. Wash out with castile soap, rinse with cold water and dry well. The egg combines with the grease and dirt and gives the scalp a thorough cleansing.

A Good Wash for the Hair.—

Vinegar	2 ounces
Salt of tartar	2 drachms
Spirits of lavender	½ ounce
Spirits of rosemary	1 ounce
Spirits of nutmeg	½ ounce
Essence of almonds	1 drachm
Essence of violets	1 drachm
Pure spring water	20 ounces

Mix and bottle for use. This makes, as well, a cool and refreshing perfume.

CARE OF THE TEETH.

Attention to the teeth should begin early in life, even during the period of first teeth. Decay of the "milk" teeth should be prevented and filling is just as important as with the permanent set. The temporary teeth must be removed in due time if they do not fall out themselves, and the permanent ones must be trained to fill their places. The teeth should be cleansed five times a day—morning, bedtime and after each meal. A soft brush is better than a stiff one so as not to wound the gums. The best dentrifice is water; sometimes a little prepared chalk or white castile soap may be used. The too frequent use of powders containing cuttlefish bone or charcoal will injure the enamel of the teeth. When the gums are tender and tend to bleed add a few drops of tincture of myrrh to the water. Avoid all patent tooth powders and washes. It is a good rule to visit the dentist once each season to find out the exact condition of these important organs. Never lose a tooth if art can save it. The shape of the jaw and face is altered by the removal of teeth. When, by reason of a collection of tartar on the teeth a powder is desired for its removal, the following will be found useful and agreeable:

Tooth Powder.—

Powdered sugar	2 drachms
Precipitate of chalk	2 ounces
Orris root	2 drachms
Bicarbonate soda	1 drachm

Mix and flavor with oil of rose or oil of teaberry.

Care of the Mouth.—After the teeth have been cleansed, a valuable addition to the toilet is a mild and pleasant antiseptic mouth wash, which sweetens the mouth and by its action on disease-producing organisms purifies the mucous lining and acts against the decomposition of the food debris which the most careful attention to the teeth cannot completely remove.

Antiseptic Mouth Wash.—

R.—Boric acid	10 grains
Resorcin	4 grains
Salol	2 grains
Thymol	½ grain
Glycerine	½ drachm
Pure water	2 ounces

Care of the Feet.—The feet are subject to many diseases, but the most common ones—ingrowing nails, corns and bunions—are due to neglect of a few simple rules which nearly all adults know. Fashion decrees that certain shapes must be worn, and the poor foot, willing to toil and bear, is pressed and pulled out of shape by misshaped shoes.

Shoes.—1. Should be neither too large nor too small. They should fit snugly but comfortably all parts of the foot.

2. The heels should be placed well back under the human heel.

3. The soles should be reasonably thick. In winter heavy soles have many advantages that are apparent.

4. Patent leather and other forms of non-porous leather are injurious as they prevent the dissipation of natural sweat. The retention of this sweat increases the tendency to soft corns and to sore feet.

5. Slippers and low shoes are to be worn only in warm weather. They expose the blood at the ankles and so encourage colds.

The toe-nails should be cut regularly and carefully. Overshoes should always be worn in wet weather. Ladies often go without them in damp weather, relying upon the thickness of the soles of their shoes, and thus expose themselves to risks. A sheet of India-rubber is sometimes placed between the layers of leather in the soles of shoes, or felt or

cork soles are placed within the shoe. There is no objection to these, providing they do not supplant the rubber overshoes.

Ingrowing Toe-Nails—Causes.—Tight shoes and the cutting of the nails square are the causes. A tight sock may also be at fault. The skin is pressed over the sharp edge of the nail and ulceration results. The edge of the nail may become thickened or proud flesh may spring up at the point of ulceration.

Treatment.—"In mild or trivial cases the trimming or clipping of the free margin of the nail, scraping of the dorsal surface with a bit of glass or with a knife, so as to reduce its thickness and to produce a tendency to curling upward and backward of its lateral margins and the removal of any cuticle accumulated under the ingrowing edges of the nail are all that is required to give relief and prevent further progress. Pressure must be avoided. When ulceration has occurred a minute roll of lint shreddings should be neatly packed beneath the tender overhanging skin and ingrowing edge. Strapping is then applied so as to retain the lint and drag upon the overhanging integument and keep it pulled away from contact with the ingrowing edge. The lint may be removed in a few days and the space filled with boric acid, iodoform, lead nitrate, alum or zinc oxide."

In severe cases avulsion of half or all the nail is required. This is a sure cure and a favorite with many physicians.

Corns.—A common corn is caused by friction or irritation of the skin from tight, loose or otherwise ill-fitting shoes, hard, stiff leather, large wrinkles over the joints, high heels that pitch the foot forward and keep it constantly bearing against the leather over the toes, and shoes narrow at the toes. In such cases the skin thickens and hardens to protect itself from injury in just the same way that it does upon the hands or other parts of the body exposed to rough contact.

Treatment.—Ordinary hard corns, when young, may be removed by scraping up the callous skin about the borders and prying out carefully with a penknife. It must be remembered for the successful treatment of corns proper foot covering must be worn. The shoes must be soft and of proper fit. Only such means can effect a radical cure. Corn cures and plasters are but a vexation if the laws of hygiene are not obeyed. The important part of treating corns is to relieve the pressure. Persons ill with a long fever, confined to their beds, have found their corns gone on getting from bed.

If the corn is between the toes the sole should be extra wide so that cotton may be put between the toes to keep them apart. Dr. Keller

(quoted in the *Therapeutic Gazette*) advises that the foot be soaked in hot water for fifteen minutes before bedtime, this followed by an application of salycilic acid in collodion, one part to three. This is repeated for five or six nights, each time removing all dead tissues with a knife after bathing. A drop of castor oil well rubbed in every night helps greatly.

Bunions.—Cause.—The great cause of bunions is the wearing of short and narrow-toed shoes, making a constant tendency to enlarge, widen and project the joint of the great toe. Bunions may prove a menace to life, especially in those past middle life. Repeated inflammations may finally go on to suppuration and this leave an ulcer which is most tedious to heal. This ulcer in those past middle age is liable to lead to erysipelas and senile gangrene. Amputation of this part of the foot has been necessary in some cases.

Treatment.—This is usually soothing. The deformity can seldom be overcome. Comfortable shoes are the things to be considered. When the bunion first appears and is characterized by simple thickening and a sensation to the examining finger as of fluid in a sack (which is just what is present), the bunion may be treated with flying blisters, tincture of iodine or strapping with mercurial ointment. If inflammation exists it should be treated as inflammation is treated elsewhere.

Chilblain or Frost-Bite.—Chilblains may be defined as an inflammation of the skin and underlying tissues due to cold. Anemic persons and those who are weakened from hunger or fatigue are more liable than their more fortunate fellows.

Symptoms.—First, redness accompanied by hypersensitiveness of the parts and tingling. This is soon followed by purplish lividity and diminished sensibility. Blanching with numbness supervenes. Next coagulation takes place and is characterized by the parts becoming hard, white, absolutely insensible. In very severe cases gangrene follows. The parts shrivel up and blacken. An inflammatory line of demarcation shows itself later.

Treatment.—In the stage of redness friction with a towel soaked in ice-water or with ice or snow should be resorted to until the congestion disappears, when the parts should be wrapped in cotton wool. The patient should not be taken into a warm room until after reaction has taken place.

Tonic treatment is indicated in nearly all cases and should consist of cod-liver oil, quinine or some such general tonic.

For the itching the following have been recommended:

Tincture of iodine; soap liniment or diluted turpentine.

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"TWILIGHT SLEEP"

OR, THE SCOPOLAMIN TREATMENT IN CHILDBIRTH

"Dämmerschlaf" or "Twilight Sleep" is the term given to a method of painless childbirth, discovered and perfected at the Frauenklinik at Freiburg, Germany, by Drs. Bernhard Krönig and Carl J. Gause, and accomplished through the use of scopolamin and morphine.

Credit for pioneer work along this line must be given to Sir James Young Simpson, a London physician, who in 1847 brought about the first spontaneous birth under artificial painlessness through the inhalation of sulphuric ether. Later he used chloroform, confining Queen Victoria in this manner in 1853. While chloroform is now extensively used in obstetrics where instruments are required, it is used only by a limited number of physicians to produce a partial anæsthesia, and thus give a measure of relief from pain, but without entirely preventing a natural childbirth.

Various other experiments have been made for producing a limited degree of narcosis in order to secure painlessness in confinement, though the Freiburg method, or "Dämmerschlaf," seems to have been most successful. In France a new method was brought to light in 1914, about the time the great war broke out, in which *antalgésine* is used, discovered by a chemist, Georges Paulin, and later taken up by Ribemont-Dessaignes, head of Beaujon Maternity. In America the so-called "laughing-gas," or nitrous oxide and oxygen, has been used with some success in various experiments, together with a dozen other anæsthetics.

The scopolamin-morphine method was first used at Freiburg in 1903. Later scopolamin was combined with nacrophin, another opium derivation. The result is a condition of semi-narcosis, sufficent to obliterate or ease the pain, but without producing complete insensibility, and without preventing the muscular contractions that are essential in natural childbirth. In other words, the condition induced is aptly expressed by the term "twilight sleep." The chief characteristic is the loss of memory, even though the patient is conscious. The success of the treatment depends very largely upon the technique employed and upon the skillful adjustment or regulation of the successive doses of the drug. Many physicians have severely condemned the "twilight sleep," but those who defend its use claim that unsatisfactory results are due entirely to faulty technique.

The most serious criticism bears on the alleged tendency of the treatment to affect the child injuriously, possibly causing asphyxiation, even though favorable to the mother. It is said that "blue babies" are likely to result, through the failure of the foramen ovale in the walls of the heart to close properly with the change in the child's circulation, which normally takes place when respiration begins. In Freiburg, however, little trouble of this kind seems to have been encountered, and after a number of years the death rate of babies born at the Frauenklinik was cut from 3.4% to 1.3%. Success is achieved in about 80% of all cases.

Two special advantages are claimed for the "twilight sleep," namely, the avoidance of the use of instruments in a majority of cases and the rapid recovery which seems to be made possible through the lack of the nervous shock and mental strain which ordinarily attends natural childbirth. It is claimed that painless childbirth will mean an increase in the birth rate, inasmuch as women will no longer dread the ordeal. The "twilight sleep" treatment seems especially suited to the requirements of nervous women.

Book VIII

SEXOLOGY

PART I.

COURTSHIP AND MATRIMONY.

Courtship.—The object of courtship should be to study dispositions and affinities, also mental and physical conditions. Falling in love first and then courting is substituting blindness for sight, folly for discretion.

Association.—Both young men and women should mingle freely in a social way before entering on courtship, for genuine courtship implies more or less direction of attention to a single person, and therefore a measure of social exclusion.

Length of Courtship.—Courtship should never be hasty. It should be prolonged until both parties are satisfied of the mutual existence of the qualities which will conduce to conjugal happiness.

Engagement.—Engagements should, as a rule, be brief. The spectacle of engaged couples trying each other's patience for years by delaying marriage is a pitiable one. The contract entered into becomes a mortgage without interest.

Affinity.—Affinity differs from love. It may exist in the marriage estate, and be productive of comfort and happiness in the absence of the sentiment of love. Yet it cannot be said that the converse of this ever, or, at least, frequently is true. Affinity rests on a variety of causes.

Mental Condition.—Mental affinity is necessary to married happiness. An ignorant man or woman should not mate with one of education, or vice versa. It cannot be said that such a union is devoid of all certainty as to happiness, but the chances for unhappiness are too great to risk.

Marriageable Age.—In temperate climates the proper marriageable age is not reached before maturity, when nature has completed and perfected the organic structure; that is to say, marriage may be entered

upon with propriety at from twenty to twenty-five years of age. Earlier marriage is likely to entail injury to health and comfort upon the wife; while marriage at a late period in life is apt to lead to puny and sickly children. Any material disproportion in the ages of man and wife should be avoided.

Marriage and Longevity.—It is a definitely ascertained result of marriage that it lengthens life, where the estate is entered upon with discretion, and conducted in a proper manner.

Ill Health and Marriage.—The marriage of unhealthy persons is liable to lead to distressing consequences. Hereditary transmission of diseases enters into the moral as well as physical order of things. This is especially true of consumptives and scrofulous people, who, as a rule, are prolific. Even if the exact hereditary taint does not pass to the offspring, there is liability to a train of the common diseases which mar comfort and destroy life.

Money and Marriage.—Marriages of convenience, that is, for money, ease or distinction, are to be deprecated. The fortune-hunter, pure and simple, is never a disinterested lover, nor a considerate life partner. The spirit of mercenariness, which prompts an alliance for convenience, grows by what it feeds upon, and is an enemy to conjugal harmony and happiness.

Religion.—Likeness in religious sentiment is necessary to conjugal happiness. It is not necessary that the man and wife should belong to the same church. What is meant is that there should be tolerance of the religious views and pious sentiments of each other. The indifferent man or woman, the intolerant, the mocking, the profane may speedily wreck the happiness, and even health, of a partner, for there is no sentiment that lies deeper, or is more sensitive, than that of piety and religion.

Tastes.—These should be so nearly akin in man and wife as to assure adaptability and accord. When a wife sees beauty in an object and a husband only ugliness, or when one is tidy and the other careless, there are constant grounds for reproachful differences, ending in unhappiness.

Mutuality.—In general, mutuality in the conjugal estate is a sharpener of love and respect, a helper to the further and fuller exercise of whatever ripens and completes manhood and womanhood, and conduces to the perfection of the estate.

Physical Characteristics.—Affinity, adaptability and all characteristics of a mental, moral and sentimental nature, which are generally recognized as essential to married happiness, do not necessarily include

physical likenesses. While two unhealthy people may not marry for fear of perpetuating disease in their offspring, such fear may not prevent the alliance of a sturdy constitution with a delicate one. Oftentimes marriage improves a delicate organization; at least, there is a possibility of the robust man or woman so modifying the condition of offspring as to eliminate hereditary disease tendencies, and produce a healthy generation.

Physical Forms.—Intercourse in the lower animals and in plants is so regulated by experts as to lead to great improvements in the species. This is equally possible in mankind. The tendency to over-proportion in male or female lines may be corrected by marriage of a large partner with one of small size. The same is true of complexions. The brunette may well marry with the blonde, with the hope of modifying parental complexions in offsprings. Some theorists carry this matter much further, and say that those having the same color of eyes should not marry; and they say the same of the hair. So large-boned people should marry those of small bones; beauty should marry homeliness; nervous people should marry their opposites; those of strong facial contour should marry those with less decided physiognomies; and so on; all, of course, with the hope of curing in their posterity what may pass for defects in the parents; or, if not defects, at least so modifying physical forms as to produce a more satisfactory form.

The Final Resolve.—Courtship has made the contemplated partners acquainted with one another. They have talked over their aims and ambitions. They have plighted troths and sealed a contract. Among the Hebrews this was the equivalent of marriage. The final resolve should, therefore, be to carry into and through the marriage estate all those high agreements which love prompted, hope cherished, and thoughtful consideration of the future suggested.

THE PERIOD OF CONCEPTION.

Woman's Courage.—Courage is assigned to man—to woman it is due. Follow her steps from the time she enters the arena of married life, study each line—each shading and its effect—as though an artist with magic brush had depicted on canvas the hidden mysteries of life's various phases, and the result will be startling to those who have been but casual observers in the past. The courage and sublimity of woman's nature is in-

herent, descending through ages, thus becoming a fixed moral quantity of woman in her kind.

Courage Illustrated.—Courage in woman is illustrated by the fortitude with which she bears her children, the cheerfulness with which she undertakes their moral and physical training, and the patience and perseverance she shows when called to tend by their sick-bed through the long, weary hours, days or weeks of their illness. All parents desire to bring into the world good, bright and healthy offspring without pain. Can it be accomplished?

Propagating Likes.—Sexual emotion is absolutely necessary to conception. The impress is made at the moment. Every quality of mind or body which is dominant then will undoubtedly determine the fate of the offspring. How imperatively necessary it is, then, at that moment, to permit nothing but the most pleasant fancies to occupy the mind, namely, the thought of those actions and things which are most desirable to reappear in children.

Natural Harmony.—Life itself should be a sober hilarity; all the senses should be in harmony with nature, and the heart should be ready to respond at the right period with a holy fidelity to the mysterious demands of the love which unites existences, and in the homes of earth educate beings to dwell in heaven.

WILL THE BABE BE BOY OR GIRL?

Function of the Ovary.—The ovary is undoubtedly the predominant factor in this respect. The only means by which the determination of sex can be influenced is by the nutritional processes in the ovary. Disturbances in the ovary in this line, dating from fœtal life, seem to determine a preponderance of male ova, while abundant normal nutritional processes favor the production of females.

We have observed, in our experience, the evidence of nutritional disturbances, as a number of mothers of boys gave birth to girls after symptoms of diabetes were first noticed.

Emotion and Secretion.—Cases of this kind might be multiplied *ad libitum*, but such instances are not needed to demonstrate that the feelings influence every fibre of our frame. The soul pervades every element of our bodies, and "in every nerve it thrills with pleasure, or grows mad with pain." The direct influence of the immortal agent over the mortal

organism is beautifully demonstrated by the effects of emotion on secretion.

Mental Association.—Hence, at such a time, how important that only the most pleasant and calming recollections should pervade the mind. This appetite, which is not essential to the life of the individual, is mainly dependent on mental associations for its activity, and should be controlled by moral principle.

CAN PARENTS CONTROL THE SEX OF THE CHILD?

Interest in the Subject.—The above subject has for a long time deeply interested the scientists, not only of Europe, but also our own country, and various experiments have been made to endeavor to found the same upon fact instead of theory.

Results of Investigation.—These experiments were at first made in the interest of science alone, but the raisers of cattle and horses, seeing an increase of gain to themselves, quickly took hold of the subject, and have endeavored to reap the advantages therefrom.

The following results, which have been carefully kept record of, elucidate the following:

1st. That the offspring of a cow or mare, if young, and the male older and in good health, was a male.

2d. If the female is mature in age, healthy and strong, the male younger and deficient in copulative strength, the offspring was a female.

3d. That when both male and female were of mature age and healthy, the offspring was about equal, male or female.

4th. If the female is old and the male young, the offspring will be male.

5th. If the male is old, with the female younger, the offspring will be female.

6th. If female was ill fed or run down by labor, the male well fed and in vigor; offspring, male.

7th. If the female was well fed and rested, and male ill fed and worked; offspring, female.

8th. That the offspring would be male or female as regards the manner in which they were treated, fed, etc.

Conclusions.—From the above we would draw the following conclusions: Men having physical and procreative propensities similar to animals, the genital function is first to feel disturbance of the nervous sys-

tem, as the top of the tree first shows that the roots are not properly nourished. The function of generation being the last to be developed has nothing directly depending on or issuing from it, it is a twig and not a main branch, like the stomach and brain; it is a periodic function, capable of long intervals of inactivity, and the rest of the body cannot only survive, but be in good condition for a time at least when this function is absolutely dead.

When a Male Child is Desired.—The husband should partake of good substantial food. Exercise in open air; indulge in light literature; keep up a glow of spirits; abstain from indulgence for a short time previous to the procreative period. During this period the wife should abstain from animal foods, living mostly on vegetables and farinaceous articles of diet; exercise daily to almost fatigue, take the following treatment and pass a portion of her time with females older than herself. The following pill should be taken, one three times daily for several weeks:

Extract Hyoscyamus	½ grain
Extract Valerian	1 grain
Extract Sumbul	1 grain
Extract Asafœtida	1 grain

When a Female Child is Desired.—Exactly the opposite course should be pursued—the woman should indulge in the most stimulating food—but should not indulge her passions, reserving her whole vigor for the desired time. The male should indulge in violent physical exercise to fatigue, and morning and night take sitz baths of cold rock-salt water.

Care of the Passions.—Abuse of the passions disturbs all the processes of life; a brutal kind of vigor in those who are reckless, but a soul that condemns its own conduct, is sure to produce disorders of the nervous system; the family of reflex centers, the brain, the stomach, the genital system; between these, messengers of evil or of good are ever passing in sleeping and in working hours; to touch one is to touch all.

TABLE OF CONCEPTION AND BARREN PERIODS.

The following table, showing the possible periods of conception and barrenness after the recurrence of each menses, or monthly, will prove helpful to married women seeking rational means of regulating procreative conduct. B stands for beginning of each period—monthly, conceptional and barren—and E for the ending of the same.

MONTHLIES. B.	E.	Period of Probable Conception. B.	E.	Probable Barren Period. B.	E.	Period of Probable Conception. B.	E.		
Jan .... 1—	3	Jan .... 4—	16	Jan ....17—	22	Jan.....23—at	next	monthly	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24— "	"	"	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25— "	"	"	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26— "	"	"	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27— "	"	"	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28— "	"	"	
" ..... 7—	9	" .....10—	22	" .....23—	28	" .....29— "	"	"	
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30— "	"	"	
" ..... 9—	11	" .....12—	24	" .....25—	30	" .....31— "	"	"	
" .....10—	12	" .....13—	25	" .....26—	31	Feb..... 1— "	"	"	
" .....11—	13	" .....14—	26	" 27–Feb. 1		" ..... 2— "	"	"	
" .....12—	14	" .....15—	27	" .....28— "	2	" ..... 3— "	"	"	
" .....13—	15	" .....16—	28	" .....29— "	3	" ..... 4— "	"	"	
" .....14—	16	" .....17—	29	" .....30— "	4	" ..... 5— "	"	"	
" .....15—	17	" .....18—	30	" .....31— "	5	" ..... 6— "	"	"	
" .....16—	18	" .....19—	31	Feb..... 1—	6	" ..... 7— "	"	"	
" .....17—	19	" 20–Feb. 1		" ..... 2—	7	" ..... 8— "	"	"	
" .....18—	20	" .....21— "	2	" ..... 3—	8	" ..... 9— "	"	"	
" .....19—	21	" .....22— "	3	" ..... 4—	9	" .....10— "	"	"	
" .....20—	22	" .....23— "	4	" ..... 5—	10	" .....11— "	"	"	
" .....21—	23	" .....24— "	5	" ..... 6—	11	" .....12— "	"	"	
" .....22—	24	" .....25— "	6	" ..... 7—	12	" .....13— "	"	"	
" .....23—	25	" .....26— "	7	" ..... 8—	13	" .....14— "	"	"	
" .....24—	26	" .....27— "	8	" ..... 9—	14	" .....15— "	"	"	
" .....25—	27	" .....28— "	9	" .....10—	15	" .....16— "	"	"	
" .....26—	28	" .....29— "	10	" .....11—	16	" .....17— "	"	"	
" .....27—	29	" .....30— "	11	" .....12—	17	" .....18— "	"	"	
" .....28—	30	" .....31— "	12	" .....13—	18	" .....19— "	"	"	
" .....29—	31	Feb..... 1—	13	" .....14—	19	" .....20— "	"	"	
" 30–Feb. 1		" ..... 2—	14	" .....15—	20	" .....21— "	"	"	
" .....31— "	2	" ..... 3—	15	" .....16—	21	" .....22— "	"	"	
Feb..... 1—	3	" ..... 4—	16	" .....17—	22	.....23— "	"	"	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24— "	"	"	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25— "	"	"	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26— "	"	"	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27— "	"	"	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28— "	"	"	
" ..... 7—	9	" .....10—	22	" .....23—	28	Mar..... 1— "	"	"	
" ..... 8—	10	" .....11—	23	" 24–Mar. 1		" ..... 2— "	"	"	
" ..... 9—	11	" .....12—	24	" .....25— "	2	" ..... 3— "	"	"	
" .....10—	12	" .....13—	25	" .....26— "	3	" ..... 4— "	"	"	
" .....11—	13	" .....14—	26	" .....27— "	4	" ..... 5— "	"	"	
" .....12—	14	" .....15—	27	" .....28— "	5	" ..... 6— "	"	"	
" .....13—	15	" .....16—	28	Mar.... 1—	6	" ..... 7— "	"	"	
" .....14—	16	" 17–Mar. 1		" ..... 2—	7	" ..... 8— "	"	"	
" .....15—	17	" .....18— "	2	" ..... 3—	8	" ..... 9— "	"	"	
" .....16—	18	" .....19— "	3	" ..... 4—	9	" .....10— "	"	"	
" .....17—	19	" .....20— "	4	" ..... 5—	10	" .....11— "	"	"	

MONTHLIES. B.	E.	Period of Probable Conception. B.	E.	Probable Barren Period. B.	E.	Period of Probable Conception. B.	E.
Feb....18—	20	Feb....21–Mar.	5	Mar.... 6—	11	Mar.....12—at next monthly	
" .....19—	21	" .....22—"	6	" ..... 7—	12	Mar.....13—" " "	
" .....20—	22	" .....23—"	7	" ..... 8—	13	" .....14—" " "	
" .....21—	23	" .....24—"	8	" ..... 9—	14	" .....15—" " "	
" .....22—	24	" .....25—"	9	" .....10—	15	" .....16—" " "	
" .....23—	25	" .....26—"	10	" .....11—	16	" .....17—" " "	
" .....24—	26	" .....27—"	11	" .....12—	17	" .....18—" " "	
" .....25—	27	" .....28—"	12	" .....13—	18	" .....19—" " "	
" .....26—	28	Mar.... 1—	13	" .....14—	19	" .....20—" " "	
" .....27–Mar.	1	" ..... 2—	14	" .....15—	20	" .....21—" " "	
" .....28—"	2	" ..... 3—	15	" .....16—	21	" .....22—" " "	
Mar.... 1—	3	" ..... 4—	16	" .....17—	22	" .....23—" " "	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24—" " "	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25—" " "	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26—" " "	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27—" " "	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28—" " "	
" ..... 7—	9	" .....10—	22	" .....23—	28	" .....29—" " "	
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30—" " "	
" ..... 9—	11	" .....12—	24	" .....25—	30	" .....31—" " "	
" .....10—	12	" .....13—	25	" .....26—	31	Apr..... 1—" " "	
" .....11—	13	" .....14—	26	" .....27–Apr.	1	" ..... 2—" " "	
" .....12—	14	" .....15—	27	" .....28—"	2	" ..... 3—" " "	
" .....13—	15	" .....16—	28	" .....29—"	3	" ..... 4—" " "	
" .....14—	16	" .....17—	29	" .....30—"	4	" ..... 5—" " "	
" .....15—	17	" .....18—	30	" .....31—"	5	" ..... 6—" " "	
" .....16—	18	" .....19—	31	Apr..... 1—	6	" ..... 7—" " "	
" .....17—	19	" .....20–Apr.	1	" ..... 2—	7	" ..... 8—" " "	
" .....18—	20	" .....21—"	2	" ..... 3—	8	" ..... 9—" " "	
" .....19—	21	" .....22—"	3	" ..... 4—	9	" .....10—" " "	
" .....20—	22	" .....23—"	4	" ..... 5—	10	" .....11—" " "	
" .....21—	23	" .....24—"	5	" ..... 6—	11	" .....12—" " "	
" .....22—	24	" .....25—"	6	" ..... 7—	12	" .....13—" " "	
" .....23—	25	" .....26—"	7	" ..... 8—	13	" .....14—" " "	
" .....24—	26	" .....27—"	8	" ..... 9—	14	" .....15—" " "	
" .....25—	27	" .....28—"	9	" .....10—	15	" .....16—" " "	
" .....26—	28	" .....29—"	10	" .....11—	16	" .....17—" " "	
" .....27—	29	" .....30—"	11	" .....12—	17	" .....18—" " "	
" .....28—	30	" .....31—"	12	" .....13—	18	" .....19—" " "	
" .....29—	31	Apr..... 1—	13	" .....14—	19	" .....20—" " "	
" .....30–Apr.	1	" ..... 2—	14	" .....15—	20	" .....21—" " "	
" .....31—"	2	" ..... 3—	15	" .....16—	21	" .....22—" " "	
Apr..... 1—	3	" ..... 4—	16	" .....17—	22	" .....23—" " "	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24—" " "	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25—" " "	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26—" " "	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27—" " "	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28—" " "	

MONTHLIES. B.	E.	Period of Probable Conception. B.	E.	Probable Barren Period. B.	E.	Period of Probable Conception. B.	E.
Apr..... 7—	9	Apr.....10—	22	Apr.....23—	28	Apr.....29—at next monthly	
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30—" " "	
" ..... 9—	11	" .....12—	24	" .....25—	30	May ..... 1—" " "	
" .....10—	12	" .....13—	25	" 26–May 1		" ..... 2—" " "	
" .....11—	13	" .....14—	26	" .....27—" 2		" ..... 3—" " "	
" .....12—	14	" .....15—	27	" .....28—" 3		" ..... 4—" " "	
" .....13—	15	" .....16—	28	" .....29—" 4		" ..... 5—" " "	
" .....14—	16	" .....17—	29	" .....30—" 5		" ..... 6—" " "	
" .....15—	17	" .....18—	30	May.... 1—	6	" ..... 7—" " "	
" .....16—	18	" 19–May 1		" ..... 2—	7	" ..... 8—" " "	
" .....17—	19	" .....20—" 2		" ..... 3—	8	" ..... 9—" " "	
" .....18—	20	" .....21—" 3		" ..... 4—	9	" .....10—" " "	
" .....19—	21	" .....22—" 4		" ..... 5—	10	" .....11—" " "	
" .....20—	22	" .....23—" 5		" ..... 6—	11	" .....12—" " "	
" .....21—	23	" .....24—" 6		" ..... 7—	12	" .....13—" " "	
" .....22—	24	" .....25—" 7		" ..... 8—	13	" .....14—" " "	
" .....23—	25	" .....26—" 8		" ..... 9—	14	" .....15—" " "	
" .....24—	26	" .....27—" 9		" .....10—	15	" .....16—" " "	
" .....25—	27	" .....28—" 10		" .....11—	16	" .....17—" " "	
" .....26—	28	" .....29—" 11		" .....12—	17	" .....18—" " "	
" .....27—	29	" .....30—" 12		" .....13—	18	" .....19—" " "	
" .....28—	30	May.... 1—	13	" .....14—	19	" .....20—" " "	
" 29–May 1		" ..... 2—	14	" .....15—	20	" .....21—" " "	
" .....30—" 2		" ..... 3—	15	" .....16—	21	" .....22—" " "	
May.... 1—	3	" ..... 4—	16	" .....17—	22	" .....23—" " "	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24—" " "	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25—" " "	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26—" " "	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27—" " "	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28—" " "	
" ..... 7—	9	" .....10—	22	" .....23—	28	" .....29—" " "	
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30—" " "	
" ..... 9—	11	" .....12—	24	" .....25—	30	" .....31—" " "	
" .....10—	12	" .....13—	25	" .....26—	31	June..... 1—" " "	
" .....11—	13	" .....14—	26	" 27–June 1		" ..... 2—" " "	
" .....12—	14	" .....15—	27	" .....28—" 2		" ..... 3—" " "	
" .....13—	15	" .....16—	28	" .....29—" 3		" ..... 4—" " "	
" .....14—	16	" .....17—	29	" .....30—" 4		" ..... 5—" " "	
" .....15—	17	" .....18—	30	" .....31—" 5		" ..... 6—" " "	
" .....16—	18	" .....19—	31	June ... 1—	6	" ..... 7—" " "	
" .....17—	19	" 20–June 1		" ..... 2—	7	" ..... 8—" " "	
" .....18—	20	" .....21—" 2		" ..... 3—	8	" ..... 9—" " "	
" .....19—	21	" .....22—" 3		" ..... 4—	9	" .....10—" " "	
" .....20—	22	" .....23—" 4		" ..... 5—	10	" .....11—" " "	
" .....21—	23	" .....24—" 5		" ..... 6—	11	" .....12—" " "	
" .....22—	24	" .....25—" 6		" ..... 7—	12	" .....13—" " "	
" .....23—	25	" .....26—" 7		" ..... 8—	13	" .....14—" " "	
" .....24—	26	" .....27—" 8		" ..... 9—	14	" .....15—" " "	

MONTHLIES. B.	E.	Period of Probable Conception. B.	E.	Probable Barren Period. B.	E.	Period of Probable Conception. B.	E.
May....25—	27	May....28–June	9	June ...10—	15	June.....16—at next monthly	
" .....26—	28	" .....29—"	10	" .....11—	16	" .....17—" " "	
" .....27—	29	" .....30—"	11	" .....12—	17	" .....18—" " "	
" .....28—	30	" .....31—"	12	" .....13—	18	" .....19—" " "	
" .....29—	31	June.... 1—	13	" .....14—	19	" .....20—" " "	
" 30–June	1	" ..... 2—	14	" .....15—	20	" .....21—" " "	
" .....31—"	2	" ..... 3—	15	" .....16—	21	" .....22—" " "	
June.... 1—	3	" ..... 4—	16	" .....17—	22	" .....23—" " "	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24—" " "	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25—" " "	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26—" " "	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27—" " "	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28—" " "	
" ..... 7—	9	" .....10—	22	" .....23—	28	" .....29—" " "	
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30—" " "	
" ..... 9—	11	" .....12—	24	" .....25—	30	July ..... 1—" " "	
" .....10—	12	" .....13—	25	" 26–July	1	" ..... 2—" " "	
" .....11—	13	" .....14—	26	" .....27—"	2	" ..... 3—" " "	
" .....12—	14	" .....15—	27	" .....28—"	3	" ..... 4—" " "	
" .....13—	15	" .....16—	28	" .....29—"	4	" ..... 5—" " "	
" .....14—	16	" .....17—	29	" .....30—"	5	" ..... 6—" " "	
" .....15—	17	" .....18—	30	July.... 1—	6	" ..... 7—" " "	
" .....16—	18	" 19–July	1	" ..... 2—	7	" ..... 8—" " "	
" .....17—	19	" .....20—"	2	" ..... 3—	8	" ..... 9—" " "	
" .....18—	20	" .....21—"	3	" ..... 4—	9	" .....10—" " "	
" .....19—	21	" .....22—"	4	" ..... 5—	10	" .....11—" " "	
" .....20—	22	" .....23—"	5	" ..... 6—	11	" .....12—" " "	
" .....21—	23	" .....24—"	6	" ..... 7—	12	" .....13—" " "	
" .....22—	24	" .....25—"	7	" ..... 8—	13	" .....14—" " "	
" .....23—	25	" .....26—"	8	" ..... 9—	14	" .....15—" " "	
" .....24—	26	" .....27—"	9	" .....10—	15	" .....16—" " "	
" .....25—	27	" .....28—"	10	" .....11—	16	" .....17—" " "	
" .....26—	28	" .....29—"	11	" .....12—	17	" .....18—" " "	
" .....27—	29	" .....30—"	12	" .....13—	18	" .....19—" " "	
" .....28—	30	July.... 1—	13	" .....14—	19	" .....20—" " "	
" 29–July	1	" ..... 2—	14	" .....15—	20	" .....21—" " "	
" .....30—"	2	" ..... 3—	15	" .....16—	21	" .....22—" " "	
July.... 1—	3	" ..... 4—	16	" .....17—	22	" .....23—" " "	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24—" " "	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25—" " "	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26—" " "	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27—" " "	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28—" " "	
" ..... 7—	9	" .....10—	22	" .....23—	28	" .....29—" " "	
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30—" " "	
" ..... 9—	11	" .....12—	24	" .....25—	30	" .....31—" " "	
" .....10—	12	" .....13—	25	" .....26—	31	Aug..... 1—" " "	
" .....11—	13	" .....14—	26	" .....27–Aug.	1	" ..... 2—" " "	

MONTHLIES. B.	E.	Period of Probable Conception. B.	E.	Probable Barren Period. B.	E.	Period of Probable Conception. B.	E.
July....12—	14	July....15—	27	July....28–Aug.	2	Aug..... 3—at next monthly	
" .....13—	15	" .....16—	28	" .....29—"	3	" ..... 4—" " "	
" .....14—	16	" .....17—	29	" .....30—"	4	" ..... 5—" " "	
" .....15—	17	" .....18—	30	" .....31—"	5	" ..... 6—" " "	
" .....16—	18	" .....19—	31	Aug.... 1—	6	" ..... 7—" " "	
" .....17—	19	" .....20–Aug.	1	" ..... 2—	7	" ..... 8—" " "	
" .....18—	20	" .....21—"	2	" ..... 3—	8	" ..... 9—" " "	
" .....19—	21	" .....22—"	3	" ..... 4—	9	" .....10—" " "	
" .....20—	22	" .....23—"	4	" ..... 5—	10	" .....11—" " "	
" .....21—	23	" .....24—"	5	" ..... 6—	11	" .....12—" " "	
" .....22—	24	" .....25—"	6	" ..... 7—	12	" .....13—" " "	
" .....23—	25	" .....26—"	7	" ..... 8—	13	" .....14—" " "	
" .....24—	26	" .....27—"	8	" ..... 9—	14	" .....15—" " "	
" .....25—	27	" .....28—"	9	" .....10—	15	" .....16—" " "	
" .....26—	28	" .....29—"	10	" .....11—	16	" .....17—" " "	
" .....27—	29	" .....30—"	11	" .....12—	17	" .....18—" " "	
" .....28—	30	" .....31—"	12	" .....13—	18	" .....19—" " "	
" .....29—	31	Aug.... 1—	13	" .....14—	19	" .....20—" " "	
" .....30–Aug.	1	" ..... 2—	14	" .....15—	20	" .....21—" " "	
" .....31—"	2	" ..... 3—	15	" .....16—	21	" .....22—" " "	
Aug.... 1—	3	" ..... 4—	16	" .....17—	22	" .....23—" " "	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24—" " "	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25—" " "	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26—" " "	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27—" " "	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28—" " "	
" ..... 7—	9	" .....10—	22	" .....23—	28	" .....29—" " "	
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30—" " "	
" ..... 9—	11	" .....12—	24	" .....25—	30	" .....31—" " "	
" .....10—	12	" .....13—	25	" .....26—	31	Sept ..... 1—" " "	
" .....11—	13	" .....14—	26	" .....27–Sept.	1	" ..... 2—" " "	
" .....12—	14	" .....15—	27	" .....28—"	2	" ..... 3—" " "	
" .....13 —	15	" .....16—	28	" .....29—"	3	" ..... 4—" " "	
" .....14—	16	" .....17—	29	" .....30—"	4	" ..... 5—" " "	
" .....15—	17	" .....18—	30	" .....31—"	5	" ..... 6—" " "	
" .....16—	18	" .....19—	31	Sept.... 1—	6	" ..... 7—" " "	
" .....17—	19	" .....20–Sept.	1	" .... 2—	7	" ..... 8—" " "	
" .....18—	20	" .....21—"	2	" ..... 3—	8	" ..... 9—" " "	
" .....19—	21	" .....22—"	3	" ..... 4—	9	" .....10—" " "	
" .....20—	22	" .....23—"	4	" ..... 5—	10	" .....11—" " "	
" .....21—	23	" .....24—"	5	" ..... 6—	11	" .....12—" " "	
" .....22—	24	" .....25—"	6	" ..... 7—	12	" .....13—" " "	
" .....23—	25	" .....26—"	7	" ..... 8—	13	" .....14—" " "	
" .....24—	26	" .....27—"	8	" ..... 9—	14	" .....15—" " "	
" .....25—	27	" .....28—"	9	" .....10—	15	" .....16—" " "	
" .....26—	28	" .....29—"	10	" .....11—	16	" .....17—" " "	
" .....27—	29	" .....30—"	11	" .....12—	17	" .....18—" " "	
" .....28—	30	" .....31—"	12	" .....13—	18	" .....19—" " "	

MONTHLIES. B.	E.	Period of Probable Conception, B.	E.	Probable Barren Period. B.	E.	Period of Probable Conception. B.	E.
Aug....29—	31	Sept.... 1—	13	Sept....14—	19	Sept.....20—at next monthly	
" .....30–Sept.	1	" ..... 2—	14	" .....15—	20	" .....21—" " "	
" .....31—"	2	" ..... 3—	15	" .....16—	21	" .....22—" " "	
Sept.... 1—	3	" ..... 4—	16	" .....17—	22	" .....23—" " "	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24—" " "	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25—" " "	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26—" " "	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27—" " "	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28—" " "	
" ..... 7—	9	" .....10—	22	" .....23—	28	" .....29—" " "	
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30—" " "	
" ..... 9—	11	" .....12—	24	" .....25—	30	Oct..... 1—" " "	
" .....10—	12	" .....13—	25	" .....26–Oct.	1	" ..... 2—" " "	
" .....11—	13	" .....14—	26	" .....27—"	2	" ..... 3—" " "	
" .....12—	14	" .....15—	27	" .....28—"	3	" ..... 4—" " "	
" .....13—	15	" .....16—	28	" .....29—"	4	" ..... 5—" " "	
" .....14—	16	" .....17—	29	" .....30—"	5	" ..... 6—" " "	
" .....15—	17	" .....18—	30	Oct .... 1—	6	" ..... 7—" " "	
" .....16—	18	" .....19–Oct.	1	" ..... 2—	7	" ..... 8—" " "	
" .....17—	19	" .....20—"	2	" ..... 3—	8	" ..... 9—" " "	
" .....18—	20	" .....21—"	3	" ..... 4—	9	" .....10—" " "	
" .....19—	21	" .....22—"	4	" ..... 5—	10	" .....11—" " "	
" .....20—	22	" .....23—"	5	" ..... 6—	11	" .....12—" " "	
" .....21—	23	" .....24—"	6	" ..... 7—	12	" .....13—" " "	
" .....22—	24	" .....25—"	7	" ..... 8—	13	" .....14—" " "	
" .....23—	25	" .....26—"	8	" ..... 9—	14	" .....15—" " "	
" .....24—	26	" .....27—"	9	" .....10—	15	" .....16—" " "	
" .....25—	27	" .....28—"	10	" .....11—	16	" .....17—" " "	
" .....26—	28	" .....29—"	11	" .....12—	17	" .....18—" " "	
" .....27—	29	" .....30—"	12	" .....13—	18	" .....19—" " "	
" .....28—	30	Oct .... 1—	13	" .....14—	19	" .....20—" " "	
" .....29–Oct.	1	" ..... 2—	14	" .....15—	20	" .....21—" " "	
" .....30—"	2	" ..... 3—	15	" .....16—	21	" .....22—" " "	
Oct .... 1—	3	" ..... 4—	16	" .....17—	22	" .....23—" " "	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24—" " "	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25—" " "	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26—" " "	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27—" " "	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28—" " "	
" ..... 7—	9	" .....10—	22	" .....23—	28	" .....29—" " "	
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30—" " "	
" ..... 9—	11	" .....12—	24	" .....25—	30	" .....31—" " "	
" .....10—	12	" .....13—	25	" .....26—	31	Nov ..... 1—" " "	
" .....11—	13	" .....14—	26	" .....27–Nov.	1	" ..... 2—" " "	
" .....12—	14	" .....15—	27	" .....28—"	2	" ..... 3—" " "	
" .....13—	15	" .....16—	28	" .....29—"	3	" ..... 4—" " "	
" .....14—	16	" .....17—	29	" .....30—"	4	" ..... 5—" " "	
" .....15—	17	" .....18—	30	" .....31—"	5	" ..... 6—" " "	

MONTHLIES. B.	E.	Period of Probable Conception. B.	E.	Probable Barren Period. B.	E.	Period of Probable Conception. B.	E.
Oct ....16—	18	Oct ....19—	31	Nov.... 1—	6	Nov..... 7—at next monthly	
" .....17—	19	" 20–Nov. 1		" ..... 2—	7	" ..... 8—" " "	
" .....18—	20	" .....21—" 2		" ..... 3—	8	" ..... 9—" " "	
" .....19—	21	" .....22—" 3		" ..... 4—	9	" .....10—" " "	
" .....20—	22	" .....23—" 4		" ..... 5—	10	" .....11—" " "	
" .....21—	23	" .....24—" 5		" ..... 6—	11	" .....12—" " "	
" .....22—	24	" .....25—" 6		" ..... 7—	12	" .....13—" " "	
" .....23—	25	" .....26—" 7		" ..... 8—	13	" .....14—" " "	
" .....24—	26	" .....27—" 8		" ..... 9—	14	" .....15—" " "	
" .....25—	27	" .....28—" 9		" .....10—	15	" .....16—" " "	
" .....26—	28	" .....29—" 10		" .....11—	16	" .....17—" " "	
" .....27—	29	" .....30—" 11		" .....12—	17	" .....18—" " "	
" .....28—	30	" .....31—" 12		" .....13—	18	" .....19—" " "	
" .....29—	31	Nov.... 1—	13	" .....14—	19	" .....20—" " "	
" 30–Nov. 1		" ..... 2—	14	" .....15—	20	" .....21—" " "	
" .....31—" 2		" ..... 3—	15	" .....16—	21	" .....22—" " "	
Nov.... 1—	3	" ..... 4—	16	" .....17—	22	" .....23—" " "	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24—" " "	
" ..... 3—	5	" ..... 6—	18	" .....19—	24	" .....25—" " "	
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26—" " "	
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27—" " "	
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28—" " "	
" ..... 7—	9	" .....10—	22	" .....23—	28	" .....29—" " "	
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30—" " "	
" ..... 9—	11	" .....12—	24	" .....25—	30	Dec ..... 1—" " "	
" .....10—	12	" .....13—	25	" 26–Dec. 1		" ..... 2—" " "	
" .....11—	13	" .....14—	26	" .....27—" 2		" ..... 3—" " "	
" .....12—	14	" .....15—	27	" .....28—" 3		" ..... 4—" " "	
" .....13—	15	" .....16—	28	" .....29—" 4		" ..... 5—" " "	
" .....14—	16	" .....17—	29	" .....30—" 5		" ..... 6—" " "	
" .....15—	17	" .....18—	30	Dec.... 1—	6	" ..... 7—" " "	
" .....16—	18	" 19–Dec. 1		" ..... 2—	7	" ..... 8—" " "	
" .....17—	19	" .....20—" 2		" ..... 3—	8	" ..... 9—" " "	
" .....18—	20	" .....21—" 3		" ..... 4—	9	" .....10—" " "	
" .....19—	21	" .....22—" 4		" ..... 5—	10	" .....11—" " "	
" .....20—	22	" .....23—" 5		" ..... 6—	11	" .....12—" " "	
" .....21—	23	" .....24—" 6		" ..... 7—	12	" .....13—" " "	
" .....22—	24	" .....25—" 7		" ..... 8—	13	" .....14—" " "	
" .....23—	25	" .....26—" 8		" ..... 9—	14	" .....15—" " "	
" .....24—	26	" .....27—" 9		" .....10—	15	" .....16—" " "	
" .....25—	27	" .....28—" 10		" .....11—	16	" .....17—" " "	
" .....26—	28	" .....29—" 11		" .....12—	17	" .....18—" " "	
" .....27—	29	" .....30—" 12		" .....13—	18	" .....19—" " "	
" .....28—	30	Dec.... 1—	13	" .....14—	19	" .....20—" " "	
" 29–Dec. 1		" ..... 2—	14	" .....15—	20	" .....21—" " "	
" .....30—" 2		" ..... 3—	15	" .....16—	21	" .....22—" " "	
Dec.... 1—	3	" ..... 4—	16	" .....17—	22	" .....23—" " "	
" ..... 2—	4	" ..... 5—	17	" .....18—	23	" .....24—" " "	

MONTHLIES. B.	E.	Period of Probable Conception. B.	E.	Probable Barren Period. B.	E.	Period of Probable Conception. B.	E.	
Dec .... 3—	5	Dec .... 6—	18	Dec ....19—	24	Dec.....25—at	next	monthly
" ..... 4—	6	" ..... 7—	19	" .....20—	25	" .....26—"	"	"
" ..... 5—	7	" ..... 8—	20	" .....21—	26	" .....27—"	"	"
" ..... 6—	8	" ..... 9—	21	" .....22—	27	" .....28—"	"	"
" ..... 7—	9	" .....10—	22	" .....23—	28	" .....29—"	"	"
" ..... 8—	10	" .....11—	23	" .....24—	29	" .....30—"	"	"
" ..... 9—	11	" .....12—	24	" .....25—	30	" .....31—"	"	"
" .....10—	12	" .....13—	25	" .....26—	31	Jan..... 1—"	"	"
" .....11—	13	" .....14—	26	" .....27–Jan.	1	" ..... 2—"	"	"
" .....12—	14	" .....15—	27	" .....28—"	2	" ..... 3—"	"	"
" .....13—	15	" .....16—	28	" .....29—"	3	" ..... 4—"	"	"
" .....14—	16	" .....17—	29	" .....30—"	4	" ..... 5—"	"	"
" .....15—	17	" .....18—	30	" .....31—"	5	" ..... 6—"	"	"
" .....16—	18	" .....19—	31	Jan .... 1—	6	" ..... 7—"	"	"
" .....17—	19	" .....20–Jan.	1	" ..... 2—	7	" ..... 8—"	"	"
" .....18—	20	" .....21—"	2	" ..... 3—	8	" ..... 9—"	"	"
" .....19—	21	" .....22—"	3	" ..... 4—	9	" .....10—"	"	"
" .....20—	22	" .....23—"	4	" ..... 5—	10	" .....11—"	"	"
" .....21—	23	" .....24—"	5	" ..... 6—	11	" .....12—"	"	"
" .....22—	24	" .....25—"	6	" ..... 7—	12	" .....13—"	"	"
" .....23—	25	" .....26—"	7	" ..... 8—	13	" .....14—"	"	"
" .....24—	26	" .....27—"	8	" ..... 9—	14	" .....15—"	"	"
" .....25—	27	" .....28—"	9	" .....10—	15	" .....16—"	"	"
" .....26—	28	" .....29—"	10	" .....11—	16	" .....17—"	"	"
" .....27—	29	" .....30—"	11	" .....12—	17	" .....18—"	"	"
" .....28—	30	" .....31—"	12	" .....13—	18	" .....19—"	"	"
" .....29—	31	Jan .... 1—	13	" .....14—	19	" .....20—"	"	"
" .....30–Jan.	1	" ..... 2—	14	" .....15—	20	" .....21—"	"	"
" .....31—"	2	" ..... 3—	15	" .....16—	21	" .....22—"	"	"

PERIOD OF GESTATION.

Length of Period.—This interesting and anxious period in a young wife's life is usually reckoned at 280 days, or 40 weeks, or 9 calendar months. Dr. Reid, in his report upon 500 cases, found the following:

23 cases in the 37th week.
48 cases in the 38th week.
81 cases in the 39th week.
131 cases in the 40th week.
112 cases in the 41st week.
63 cases in the 42d week.
28 cases in the 43d week.
8 cases in the 44th week.
6 cases in the 45th week.

Reckoning the Count.—It would be well in reckoning the "count" to begin about three days after the last monthly period, the rule being that conception is more likely soon after menstruation than at any other time.

A Pregnancy Table.—The following table, showing the probable beginning, duration and completion of pregnancy, and indicating the date on or about which the date of labor may be expected, may be found both convenient and useful. It allows three days after the usual 280 days; that is, the "count" begins three days after the last monthly or menstrual period:

THE PREGNANCY TABLE.

Last Day of Monthlies.	Labor On or About.	Last Day of Monthlies.	Labor On or About.	Last Day of Monthlies.	Labor On or About.
Jan. 1	Oct. 11	Feb. 5	Nov. 15	Mar. 12	Dec. 20
" 2	" 12	" 6	" 16	" 13	" 21
" 3	" 13	" 7	" 17	" 14	" 22
" 4	" 14	" 8	" 18	" 15	" 23
" 5	" 15	" 9	" 19	" 16	" 24
" 6	" 16	" 10	" 20	" 17	" 25
" 7	" 17	" 11	" 21	" 18	" 26
" 8	" 18	" 12	" 22	" 19	" 27
" 9	" 19	" 13	" 23	" 20	" 28
" 10	" 20	" 14	" 24	" 21	" 29
" 11	" 21	" 15	" 25	" 22	" 30
" 12	" 22	" 16	" 26	" 23	" 31
" 13	" 23	" 17	" 27	" 24	Jan. 1
" 14	" 24	" 18	" 28	" 25	" 2
" 15	" 25	" 19	" 29	" 26	" 3
" 16	" 26	" 20	" 30	" 27	" 4
" 17	" 27	" 21	Dec. 1	" 28	" 5
" 18	" 28	" 22	" 2	" 29	" 6
" 19	" 29	" 23	" 3	" 30	" 7
" 20	" 30	" 24	" 4	" 31	" 8
" 21	" 31	" 25	" 5	April 1	" 9
" 22	Nov. 1	" 26	" 6	" 2	" 10
" 23	" 2	" 27	" 7	" 3	" 11
" 24	" 3	" 28	" 8	" 4	" 12
" 25	" 4	Mar. 1	" 9	" 5	" 13
" 26	" 5	" 2	" 10	" 6	" 14
" 27	" 6	" 3	" 11	" 7	" 15
" 28	" 7	" 4	" 12	" 8	" 16
" 29	" 8	" 5	" 13	" 9	" 17
" 30	" 9	" 6	" 14	" 10	" 18
" 31	" 10	" 7	" 15	" 11	" 19
Feb. 1	" 11	" 8	" 16	" 12	" 20
" 2	" 12	" 9	" 17	" 13	" 21
" 3	" 13	" 10	" 18	" 14	" 22
" 4	" 14	" 11	" 19	" 15	" 23

Last Day of Monthlies.	Labor On or About.
Apr. 16	Jan. 24
" 17	" 25
" 18	" 26
" 19	" 27
" 20	" 28
" 21	" 29
" 22	" 30
" 23	" 31
" 24	Feb. 1
" 25	" 2
" 26	" 3
" 27	" 4
" 28	" 5
" 29	" 6
" 30	" 7
May 1	" 8
" 2	" 9
" 3	" 10
" 4	" 11
" 5	" 12
" 6	" 13
" 7	" 14
" 8	" 15
" 9	" 16
" 10	" 17
" 11	" 18
" 12	" 19
" 13	" 20
" 14	" 21
" 15	" 22
" 16	" 23
" 17	" 24
" 18	" 25
" 19	" 26
" 20	" 27
" 21	" 28
" 22	Mar. 1
" 23	" 2
" 24	" 3
" 25	" 4
" 26	" 5
" 27	" 6
" 28	" 7
" 29	" 8
" 30	" 9
" 31	" 10
June 1	" 11
" 2	" 12

Last Day of Monthlies.	Labor On or About.
June 3	Mar. 13
" 4	" 14
" 5	" 15
" 6	" 16
" 7	" 17
" 8	" 18
" 9	" 19
" 10	" 20
" 11	" 21
" 12	" 22
" 13	" 23
" 14	" 24
" 15	" 25
" 16	" 26
" 17	" 27
" 18	" 28
" 19	" 29
" 20	" 30
" 21	" 31
" 22	April 1
" 23	" 2
" 24	" 3
" 25	" 4
" 26	" 5
" 27	" 6
" 28	" 7
" 29	" 8
" 30	" 9
July 1	" 10
" 2	" 11
" 3	" 12
" 4	" 13
" 5	" 14
" 6	" 15
" 7	" 16
" 8	" 17
" 9	" 18
" 10	" 19
" 11	" 20
" 12	" 21
" 13	" 22
" 14	" 23
" 15	" 24
" 16	" 25
" 17	" 26
" 18	" 27
" 19	" 28
" 20	" 29

Last Day of Monthlies.	Labor On or About.
July 21	Apr. 30
" 22	May 1
" 23	" 2
" 24	" 3
" 25	" 4
" 26	" 5
" 27	" 6
" 28	" 7
" 29	" 8
" 30	" 9
" 31	" 10
Aug. 1	" 11
" 2	" 12
" 3	" 13
" 4	" 14
" 5	" 15
" 6	" 16
" 7	" 17
" 8	" 18
" 9	" 19
" 10	" 20
" 11	" 21
" 12	" 22
" 13	" 23
" 14	" 24
" 15	" 25
" 16	" 26
" 17	" 27
" 18	" 28
" 19	" 29
" 20	" 30
" 21	" 31
" 22	June 1
" 23	" 2
" 24	" 3
" 25	" 4
" 26	" 5
" 27	" 6
" 28	" 7
" 29	" 8
" 30	" 9
" 31	" 10
Sept. 1	" 11
" 2	" 12
" 3	" 13
" 4	" 14
" 5	" 15
" 6	" 16

Last Day of Monthlies.	Labor On or About.
Sept. 7	June 17
" 8	" 18
" 9	" 19
" 10	" 20
" 11	" 21
" 12	" 22
" 13	" 23
" 14	" 24
" 15	" 25
" 16	" 26
" 17	" 27
" 18	" 28
" 19	" 29
" 20	" 30
" 21	July 1
" 22	" 2
" 23	" 3
" 24	" 4
" 25	" 5
" 26	" 6
" 27	" 7
" 28	" 8
" 29	" 9
" 30	" 10
Oct. 1	" 11
" 2	" 12
" 3	" 13
" 4	" 14
" 5	" 15
" 6	" 16
" 7	" 17
" 8	" 18
" 9	" 19
" 10	" 20
" 11	" 21
" 12	" 22
" 13	" 23
" 14	" 24

Last Day of Monthlies.	Labor On or About.
Oct. 15	July 25
" 16	" 26
" 17	" 27
" 18	" 28
" 19	" 29
" 20	" 30
" 21	" 31
" 22	Aug. 1
" 23	" 2
" 24	" 3
" 25	" 4
" 26	" 5
" 27	" 6
" 28	" 7
" 29	" 8
" 30	" 9
" 31	" 10
Nov. 1	" 11
" 2	" 12
" 3	" 13
" 4	" 14
" 5	" 15
" 6	" 16
" 7	" 17
" 8	" 18
" 9	" 19
" 10	" 20
" 11	" 21
" 12	" 22
" 13	" 23
" 14	" 24
" 15	" 25
" 16	" 26
" 17	" 27
" 18	" 28
" 19	" 29
" 20	" 30
" 21	" 31

Last Day of Monthlies.	Labor On or About.
Nov. 22	Sept. 1
" 23	" 2
" 24	" 3
" 25	" 4
" 26	" 5
" 27	" 6
" 28	" 7
" 29	" 8
" 30	" 9
Dec. 1	" 10
" 2	" 11
" 3	" 12
" 4	" 13
" 5	" 14
" 6	" 15
" 7	" 16
" 8	" 17
" 9	" 18
" 10	" 19
" 11	" 20
" 12	" 21
" 13	" 22
" 14	" 23
" 15	" 24
" 16	" 25
" 17	" 26
" 18	" 27
" 19	" 28
" 20	" 29
" 21	" 30
" 22	Oct. 1
" 23	" 2
" 24	" 3
" 25	" 4
" 26	" 5
" 27	" 6
" 28	" 7
" 29	" 8
" 30	" 9
" 31	" 10

LESSENING OF THE PAIN OF CHILDBIRTH.

Pain is Abnormal.—In the beginning of his career the obstetrician is confronted with the question as to whether pain during labor is a natural phenomenon or not. Looking over the animal kingdom in a general way we are obliged to admit that there is more or less natural pain at this time. The question thus resolves itself into what is normal and what is an abnormal amount of pain. Depending upon the individual, a normal amount of pain in one case would be abnormal in another, or *vice versa*. We must admit that pain at this period is of a much more abnormal character in the higher classes of human beings than in the lower. For instance, the active housewife is less apt to have the amount of pain during labor that the lady of leisure is prone to have. In both cases, however, in comparison with the lower orders of animal life, the amount of pain suffered appears to be abnormal.

Rules for Avoiding Pain.—The first duty of the obstetrician is, therefore, to lessen as much as possible the amount of pain suffered at this period. The measures to be taken must be primarily prophylactic in character, although much can be done at the period of confinement to relieve pain. During pregnancy the modern dress is to be condemned, if not at all times. The weight of both under and outer garments should fall upon the shoulders and not upon the hips and abdomen, and the waist should be left untrammeled. Corsets should not be worn at all, and, if needed, the bust should be supported by a band or girdle. Then, attention should be directed to the diet, which should be principally vegetable in character, the farinaceous foods and fruits being most freely used. Stewed and cooked fruits are especially to be recommended to the patient. Meat in small quantities should be allowed only once a day, and then well cooked.

An Easy Childbed.—There is always more or less congestion in the pelvic organs during pregnancy, which appears to increase as the time of confinement approaches. This is a natural accompaniment of the great changes which are taking place during this period, and is unquestionably the reason that in no animal life is birth unattended by pain. Here much can be done by the obstetrician to allay the possibility of pain, and, depending greatly upon his care and in the selection of his drugs, to allay this general inflammation, will be his principal success in insuring his patient a comparatively easy childbed.

Remedy Against Pain.—One of the best remedies is the *saw palmetto.* It has given excellent results in lessening pain. Its principal field of action is the pelvic organs, to which it is unquestionably an antiphlogistic tonic and anodyne. It allays the inflammation of the membranes of these organs and appears to have a soothing action on the nerve supply of the womb, ovaries and bladder. Hence, the beneficial results to be obtained by its use—in teaspoonful doses four times a day for the last eight weeks of pregnancy—is to place the organs in such a condition that pain will be reduced to a minimum.

Auxiliary Remedies.—As a prophylactic measure we would suggest daily oil massage of the abdominal and perineal muscular walls from the fifth month on, and the administration of teaspoonful doses of sweet oil, with the saw palmetto, during the last two months. If the above instructions are implicitly carried out during labor, there will be little use for anything to relax the muscles and relieve pain. However, where pain to an excessive degree exists we administer chloroform in the second and sometimes in the third stage of labor. It should not be pushed to the full extent of unconsciousness. It is best administered by the patient herself. As soon as she begins to reach this stage the cone falls from her hand and is not used again until the patient fully recovers. In this way comparatively little chloroform is used and the best results obtained.

WHAT TO DO IF BIRTH OCCURS IN THE ABSENCE OF A PHYSICIAN.

In such an emergency and until a doctor arrives the midwife or attendant should know something of the nature of the presentation of the child. If a head presentation, and the birth be difficult by reason of a failure of the shoulders to pass, the forefinger may be inserted under the child's armpit, and gentle pulling exerted. This assistance overcomes the difficulty in most instances.

The Navel Cord.—Place the child to one side, beyond range of the mother's discharges, seeing, of course, that a possible wrapping of the navel cord about its neck does not interfere with its breathing, and that the mucus be removed from its mouth. As soon as the child has given signs of life by breathing and crying, and not before, tie a strong string tightly around the navel cord, some two inches from the belly, and knot it well. Do the same some four inches from the belly. Then cut the cord between the two tyings.

The Afterbirth.—Do not pull on the navel cord to help the expulsion

of the afterbirth (placenta). Give time for its natural expulsion. If it prove tardy the abdomen in the region of the womb should be subjected to gentle friction and pressure by the hand. This will stimulate the womb to expel the afterbirth. When the afterbirth has passed a stout, broad bandage should be drawn firmly around the abdomen and fastened. A doctor might not use such a bandage at all, but it is well for a nurse in his absence to do so as a precaution against hemorrhage. It should be worn for several weeks.

Necessity for Rest.—The mother should not be allowed to move from her position or to exert herself for several hours after delivery. Every hour spent in perfect quiet reduces the chances of flooding. After this rest, and perhaps a little sleep with it, if a cup of warm tea has been given, the bed may be dressed, the mother not, however, changing posture. Or she may be moved to a clean bed.

The Infant.—Meanwhile the infant should have been well greased all over with lard or oil, and dressed; the next day thoroughly bathed in warm water. After being dressed, it should be placed with its mother, both to nourish itself and to encourage the flow of milk. By this time a doctor should surely have arrived, and his business would naturally be to look after the further welfare of the mother and child.

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SEXOLOGY

PART II.

THE MOTHER AND THE CHILD

The expectant mother should not be considered as an invalid. To be with child is a natural physiological process, the fulfilling of the Divine mandate, and the highest crowning act of womanhood, yet the state of pregnancy is one involving the most delicate and highly sensitive organism, and requires careful consideration both from the standpoint of the woman herself and the new life which she is bringing into being. Prenatal influences and education are of vast importance, yet they are greatly neglected and persistently misunderstood. Those who would have healthy children must be themselves healthy. They must obey the laws of nature and morality. They must not expect good fruit from poor soil. Physical strength, good organization, agreeable temper and nobleness of mind beget their like; drunkenness, debility, debasement of body and mind, yield similar characteristics in the progeny. Children who inherit the former start from the highest vantage ground; children with the latter start in the race of life handicapped and at great disadvantage.

PREGNANCY.

Signs of Pregnancy.—The natural question of the expectant mother is as to how pregnancy manifests itself. The following are usual and predominating signs:

1. **Cessation of Menstruation.**—Other causes may suspend the menstrual flow, and not only so, but in some cases the menstrual flow is not suspended during first month or so of pregnancy. But it is usually true that this is a reliable sign, especially if menstruation has previously been regular. The missing of two successive periods, however, may be taken as a sign.

2. **Changes in the Breasts.**—If the menstrual flow has been suspended and at the same time there are unusual sensations in the breasts, such as tenderness to pressure, stinging, prickling, and so forth, these may be accepted as further indication that pregnancy exists.

3. **Morning Sickness.**—This is especially noticeable in the first preg-

nancy. Usually on rising there is considerable nausea which may or may not be accompanied by vomiting. Occasionally this nausea occurs in the evening instead of the morning.

4. **Disturbances in Urination.**—In the early period of pregnancy there is often desire to frequently empty the bladder, and there are sometimes other annoying symptoms. These usually are due to pressure of the growing womb against the bladder and generally disappear after a few weeks.

5. **"Quickening."**—This is the movement of the child in the womb, and is usually felt about the sixteenth to the eighteenth week. This as a rule may be accepted as conclusive that pregnancy exists.

Duration of Pregnancy.—Countless cases of childbirth in many countries and under all conditions have fixed the duration of pregnancy at approximately 39 weeks or 273 days. Figuring thirty days to the month it will be seen that the commonly mentioned period of nine months is not far astray. To arrive at the date on which a given birth will occur there are many ways of reckoning. (Consult index for special table, which will be found interesting.) However, to roughly estimate, the simplest rule is to count forward 280 days from the beginning of the last menstrual flow, thus allowing seven days for the menstrual period, or what amounts to the same thing, count backward 85 days, or possibly still more easy, count back three months and add seven days. It will seldom occur that the exact date will be thus arrived at—some will occur a few days earlier and some a few days later, but it is nevertheless a good general rule. Example: If the last menstruation began on 30th September, count back three months to 30th June and add seven days, giving the date of expected birth as 7th of July.

By consulting the general index and looking under the respective sub-headings, there will be found full information in the matters of Conception, Pregnancy, Labor and other relevant subjects; but it is essential in this chapter to call attention to the special care which the condition of pregnancy demands. From the earliest moment after conception more than usual care should be taken as to general health, clothing, baths, diets and so forth, and therefore we shall here treat briefly as to such things as are most vitally exigent during pregnancy.

PERSONAL HYGIENE DURING PREGNANCY.

Clothing.—This should be loose and comfortable and adapted to the gradual development of the abdomen and the breasts. Tight lacing is

injurious to both mother and child and should be carefully avoided. It gives rise to disorders of the stomach and liver and may cause uterine hemorrhage and abortion. The clothing should be sufficiently warm to protect against cold and the feet should be especially guarded in such regard. In winter or in cold and damp seasons a flannel bandage or roller around the abdomen will prove a valuable protection. The ordinary corset should be discarded early in pregnancy. There are models which are intended for the woman during this period, and unless the expectant mother decides to do without wearing corsets at all, she will find it well for her own comfort and also for the welfare of the coming child, to provide herself with corsets especially adapted to the needs of pregnancy. Too much care cannot be taken not to let the feet become damp, and not only should the feet be properly protected in such regard, but special care should be exercised that the shoes worn are comfortable. Pregnancy demands that there shall not be unnecessary strain on the nervous system, and few things are harder on the nerves than painful feet. Comfortable shoes are an essential. Toward the end of pregnancy the feet sometimes swell, and it is then necessary to wear larger shoes and of more comfortable shape than may be necessary at other times. High heels should not be used for not only is there greater danger of falling, but the wearing of high heels unduly throws the weight of the body forward and brings undesirable pressure upon the lower part of the abdomen, already under strain.

Exercise.—All kinds of harsh or agitating exercise should be avoided, such as riding rapidly in a carriage over rough roads, horseback riding, lifting or carrying heavy loads, in short, anything that may jar or strain. But short, gentle and frequent walks should be taken throughout the whole period of pregnancy, and much of the time should be spent in the open air with mild exercise and occupation, and in this way the general health be kept in proper tone, the growing fœtus be nourished and strengthened and foundation laid for an easy labor and a good getting up. It is the abundance of air and occupation that largely explains the rapid labors and speedy recoveries of poor women. They are obliged to work, but in their very toil they are favoring nature's operations and their compensation is an easy confinement, unattended by much inconvenience or anxiety. Indolence during pregnancy is enervating to mother and fœtus.

Rest.—A pregnant woman should retire early to rest—at least by ten o'clock—and be up in good time in the morning for her ablution,

morning stroll in seasonable weather, and an early breakfast. She should use every means in her power to make and keep herself healthy, not only for the sake of herself and her husband, but also for the sake of the forming child within her and the welfare of humanity.

Fresh Air and Ventilation.—Fresh air is needed by everyone. It is indispensable to health. It is especially essential to the pregnant woman. Where circumstances and weather permit there is nothing better for her than to sleep out of doors. Where this is not possible she should sleep with windows and doors so arranged as to give the maximum of ventilation, having due regard that there shall be no draughts. Not only is this necessary as regards the sleeping room, but it is also just as essential that the living rooms of the home should be thoroughly and properly ventilated. The windows in all occupied rooms of the house should be thrown wide open at different times of the day even in cold weather, that fresh air may enter. Unchanged air is unfit for the human lungs, and it is especially harmful to the pregnant woman.

Baths and the Care of the Skin.—These are very important matters. While the skin should be kept in good condition at all times, it is especially necessary during pregnancy, as at this time the work of all the excretory organs is increased and the skin is one of the most important of these organs. It contains millions of pores which provide outlet for the waste material thrown off by the sweat glands. In a healthy person about a pint of water is each day eliminated through these pores, carrying with it various waste material. If the pores become clogged,the waste products are kept in the blood until they are disposed of by the lungs, bowels and kidneys, and this retarded elimination is injurious to the whole system. The pores must be kept open, the skin generally in healthy condition, and circulation stimulated, and this can be best attained by washing the entire body thoroughly every day, followed by good towel friction. Shower, tub or sponge bath may be used, and while the body is still wet should be briskly rubbed with a rough towel. A morning bath is recommended in most cases as it is usually more effective, and there is less danger of catching cold if the water is cool. Cold baths are not to be recommended as a rule, though if a woman has been accustomed to a cold morning plunge, it is sometimes permissible to continue it during pregnancy, provided she gets into a healthy glow by brisk rubbing immediately afterward, and that the shock is not too great. However, as a general rule it is recommended that at this time the chill should be taken from the water. In addition to this daily cool bath the pregnant woman should take either two or three

warm baths each week, using plenty of soap as these are necessary for the thorough cleansing of the skin. These warm baths should be taken at night just before retiring. Hot baths are sometimes beneficial and give rest, but the pregnant woman should avoid taking hot baths at the time of the normal menstrual flow and at no time during pregnancy should the hot bath be taken frequently. Both in respect of hot baths and very cold baths much discrimination is necesary during pregnancy, it being safer as a rule to confine the baths to the daily cool (not cold) bath and the bi-weekly warm bath.

Diet.—A due amount of care should be given to diet. Meat should be eaten but once a day; rich soups and highly-seasoned foods avoided, and all alcoholic stimulants strictly shunned. During the earlier stages of pregnancy rather less should be eaten than at ordinary times, for although it is true that two have to be nourished instead of one, yet there is less drain upon the system because the expectant mother is no longer unwell and the fœtus up to the third month is not much larger than an egg. An overloaded stomach favors the distressing nausea and morning sickness of early pregnancy. During the latter months of pregnancy, however, the diet should be fuller, for if it be too light it is likely to make the mother a poor nurse for her child, both in the quantity and quality of her milk.

Condition of the Bowels.—Almost all women suffer from greater or less constipation during this period. This is largely due to increased pressure exerted by the enlarging womb upon the intestines and this becomes greater during the latter months. It is of the greatest importance throughout pregnancy that the bowels should move freely at least once a day. Whenever this can be accomplished by laxative foods resort should not be had to purgatives or enemas. A good laxative diet will include fresh fruits such as apples, peaches, pears, oranges, cherries, figs, pineapples, grapes, strawberries, raspberries, grapefruit, etc. Cooked fruits, such as prunes, apples, apricots, etc., are not so effective but are wholesome and may be eaten freely. The activity of the intestines is stimulated and increased by graham and whole-wheat bread, corn-meal and the bran foods. Ordinary bran, eaten raw with good cream is often successful in relieving constipation at this period when other things fail. Bran bread is often beneficial, and the following recipe is recommended: 1 cup of cooking molasses, 1 teaspoonful of soda, 1 small teaspoonful of salt, 1 pint of sour milk or buttermilk, 1 quart of bran, 1 pint of flour; stir well and bake for one hour in a very slow oven. It may be baked in

loaf form or as bran biscuits or "gems" as may be preferred. This bran bread may be eaten freely every day and if persisted in is almost certain to give favorable results. Do not bake too much at one time, as it becomes quickly hard, whereas it should be eaten moist and tender. Fresh vegetables are wholesome at this time, and if eaten with olive oil are laxative. Onions, asparagus, tomatoes, peas, spinach and practically all vegetables are recommended, but sometimes some of them, such as cabbages, radishes, etc., are not readily digested, and when this is found to be the case in respect of any vegetable or other article of food, the same should be eliminated from the diet. Different people are affected differently in this regard.

If constipation is not relieved by diet, the old and well-known remedy of senna may be tried. One good receipt is that for "Senna Prunes:" An ounce of senna leaves is put in a jar and a quart of boiling water poured over them; let them stand two hours, then strain, and to the liquid add a pound of well-washed prunes and let them soak over night; then cook in the same water until tender, sweetening with two tablespoonfuls of brown sugar. The syrup and the fruit are both laxative. Commence with half a dozen prunes with syrup at night and increase or decrease the quantity as may be found advisable. Another receipt is the following: Remove the stones from a pound of dried prunes and mix with them a pound of good dried figs, first having thoroughly washed the prunes; run the mixture through a meat chopper, adding two ounces of finely-powdered senna leaves. Stir this mixture with two tablespoonfuls of molasses. This makes a thick paste. Commence at bedtime by eating about three good tablespoonfuls and increase or decrease on following nights as may be deemed expedient. The paste should be kept covered in a glass jar and in a cool place. If the senna is unpalatable commence with a smaller quantity and gradually increase. If constipation continues in spite of these measures, it will be well to consult the family physician before resorting to purgatives. Enemas are sometimes helpful, but their regular employment is not advised.

Condition of the Breasts.—Every mother should have an inborn desire to nurse the coming baby. Breast-fed babies as a rule thrive better than bottle-fed babies. More bottle-fed babies die than breast-fed babies. It is estimated from carefully prepared statistics that the breast-fed baby has seven times as good a chance to live as a bottle-fed baby. Also it is better for the health and happiness of the mother if she be able to nurse her child. The healthful measures already set forth, if properly followed,

will greatly tend to make the mother competent to nurse her baby when it comes, but it is necessary to say a word in regard to the breasts during pregnancy that these may be found in proper condition when the time comes. The clothing of the expectant mother should be sufficiently loose to give ample room for development of the breasts. During the latter months of pregnancy special regard should be had to the nipples. They require toughening at this time, and every night at bed time should be washed with warm soap and water, then anointed with lanolin and covered with a piece of soft linen. They sometimes require special attention in addition to this, and it is therefore well to have the family physician observe the condition of the nipples about eight weeks before confinement that he may determine whether or not any special treatment is necessary.

Teeth and Bone.—In order that the child may have good teeth and good bone it is necessary to begin with the expectant mother. She must not only have plenty of good fresh air and good food, but the food must be of a nature to create bone in the forming child. Science has proven that the formation of various tissues in our bodies are influenced by the nature of our diet and that in order to meet the requirements of our systems our food must contain the elements which go to make up these tissues. So if we wish the baby's teeth and bones to be as they should be we must incorporate in the mother's food such elements as will make the right bone formation. This may be done by supplying the system with the required elements in a medicinal form, but if we can sufficiently supply these elements in the food itself, we will find our purpose better and more economically accomplished than by the administration of medicine. An analysis of bone shows it to be chiefly composed of the phosphate and carbonate of lime, with the chloride of sodium and phosphate of magnesia present in small quantities. Unless, then, the food taken by the mother contains an adequate proportion of these bone-forming elements, the child will either be lacking in such regard or the mother will be deprived of these elements for her own bones and so harmed. Teeth and bones owe their hardness to phosphate of lime, which is found in abundance in whole wheat bread and those cereals which consist of the whole kernel of wheat, oats or rye, but is absent in things made from white flour from which the gluten has been abstracted. The child that is deprived of lime phosphates in its food is likely to be subject of rickets, curvature of the spine and loss of teeth, and young or old people who live chiefly on white bread, pastry and the like are sure to have trouble with their teeth. Alkaline, phosphates, and other soluble salts are found in meat, eggs, milk and also in many articles of the vegetable kingdom. In the matter

of this creation of teeth and bone the use of lime water is strongly recommended. It may be purchased at any drug store or may be made at home by putting a piece of quick-lime the size of a hickory nut into an eight ounce bottle and fill with water, shaking to facilitate dissolution. After the lime settles the top is poured off. It is taken with milk in proportion of about one part of lime water to ten parts of milk. It is a well-known fact that no matter how good her teeth have previously been, when she begins to bear children every woman commences to suffer with her teeth. The cause lies partly in the fact that the woman lacks sufficient lime in her system to supply her own needs and those of the forming child, which in consequence absorbs the substance for its bones from the roots of the mother's teeth, and partly because the disturbance of nutrition during pregnancy is frequently the cause of an acid condition of the mouth with inflammation of the mucous membrane, accompanied by sore and bleeding gums. These sometimes become so sore as to makes it impossible to use a toothbrush and food lodging in and between the teeth ferments, makes a feeding ground for bacteria and causes further acidity. These conditions, acting through the fifth nerve, which supplies the teeth, not infrequently gives rise to a severe toothache that may continue some hours, notwithstanding that there may be no decayed teeth in the mouth. If the teeth are in good order, the saliva should be examined and kept in a neutral condition—that is, neither acid or alkaline in reaction. Tests can be regularly made with red and blue litmus paper which may be obtained at any drug store. Moisten the tongue with saliva and touch it to a piece of blue litmus paper, and if it be acid this blue paper will turn red—if it should be alkaline it will turn the red paper blue. By the use of alkaline mouth washes this condition of acidity may be relieved. Dentists commonly recommend what is called milk of magnesia (Phillips), but any good antiseptic mouth wash will be found serviceable, such as borolyptol, listerine, pasturine and glyco-thymoline. But where gums are very soft and spongy it may be found necessary to use a more astringent wash to harden and shrink the gums, and for such cases the following prescription is recommended:

R.—Tr. of myrrh ..... 2 drachms
Tr. cinchona co. ..... 6 drachms
Honey ..... 1 ounce
Water ..... 2 ounces
Rub on the gums several times a day.

Or tincture of myrrh in water as a gargle may be used, teaspoonful to a glass of water.

In such cases as this prescription fails it will be advisable to see a dentist, who will be able to undertake a thorough cleansing of the teeth in the recesses of the gums which cannot be reached with the toothbrush in the ordinary way. It is true that there is a very popular opinion prevalent that no woman should enter the dentist chair while in pregnancy, but the best authorities to-day are of opinion that if the dentist be properly qualified and the condition be made known to him, he will operate in such manner as to cause no harm, but on the contrary greatly benefit the patient. Brightness and cheerfulness during pregnancy is essential for the welfare of both mother and offspring, and it is not too much to say that there cannot be requisite cheerfulness where the expectant mother is a constant sufferer from toothache. It is then of vital importance that suffering from troubles of the teeth should be removed, and if ordinary means are not sufficient then that a competent dentist should be consulted, but he must be told of the condition of the patient.

Necessity of Comfort and Cheerful Surroundings.—It is of the utmost importance that the expectant mother be surrounded with comfort, cheer and happiness; that no unkindness be shown her by her husband or family; that she have all advantages of mental ease and comfort to implant in the miniature human being qualities good and noble. How readily mothers believe in birth-marks, yet how ignorant or negligent many of them are of prenatal impressions affecting health and morals. The pregnant woman, too, must be cheerful herself. It is a duty she owes the coming child.

Mutual Injuries.—It is to be remembered that during a prolonged period mother and child form together but one living existence, and whatever injures the mother's constitution also involves that of her progeny. A fall that in any way hurts the mother may equally harm the unborn child and oftentimes to even greater and fatal effect.

The Father.—It is not amiss here to say that the health of the father at the time of impregnation also influences very much the future child's welfare. He should be physically and morally sound.

SOME ILLS OF PREGNANCY AND HOW TO AVOID THEM.

Nausea and Vomiting.—The majority of pregnant women suffer from "morning sickness." It is a distressing but not an alarming ailment. A little dry food, such as toast or crackers, taken before rising and well chewed and then swallowed without liquid will sometimes relieve the

trouble. Some women find comfort and good results from taking a cup of tea or coffee, while with others they may have the reverse effect. A good preventive is to eat six small meals a day instead of three large ones, eating very lightly at the last meal of the day. The tendency to nausea is easily established and it is therefore important to ward off the initial attack. Keep the mind from dwelling on the subject of sickness and from anticipating the attack of nausea. A healthy mental attitude is of great advantage in this regard. Worry or any other morbid condition of mind exaggerates the ailment. Plenty of out-of-door life and a cheerful, happy mind will do much to counteract this illness. However, if there is much vomiting and this increases or persists in spite of precautionary measures, the family physician should be consulted, as medical skill is sometimes necessary to cope with it.

Heartburn.—This is a sensation of burning in the throat caused by an abnormal development of acid in the stomach. It has nothing whatever to do with the heart. The trouble may be overcome by taking a glass of rich milk or a tablespoonful of olive oil fifteen or twenty minutes before each meal, the idea being that the fat in the milk or oil will retard the secretion of acids. However, if an attack has begun it will only be aggravated by taking milk, oil or any other fat, and everything in the way of milk, oil or fat or greasy food must be avoided until the attack is over. This trouble is sometimes most succesfully treated by means of alkaline drinks. A good prescription is the following: Bismuth subnit., 24 grains; magnesia powd., 1 drachm; sugar milk, 1 drachm. In 12 powders; one after feeding.

Cramps.—These sometimes occur during the later months of pregnancy owing to pressure on the nerves, the attacks frequently occurring during sleep or when the limbs are stretched upon waking. Relief may be obtained by rubbing and by application of hot cloths. To merely elevate the feet will sometimes be sufficient.

Kidney Complications.—If there be any tendency to kidney trouble it is more apt to manifest itself during pregnancy than at other time, and also during this period there may be discomfort from the kidneys without any real kidney trouble. The quantity of urine passed in 24 hours should be from time to time measured. If less than three pints be passed during that time it is evidence that not enough water is being taken. If also the urine is dark in color and shows sediment, it is evident that the pregnant woman must drink more water. The two dangerous elements in urine to be guarded against are sugar and albumen. Their

presence can only be told by specific chemical tests, and as the presence of either of these elements in the urine may be of serious import, every pregnant woman should have her urine frequently examined by the family physician, say not less than once a month during the earlier stages of pregnancy and twice a month during the latter half, or even more frequently if there be suspicion. Use a perfectly clean jar or vessel with a cover. This must be thoroughly scalded and kept in a cool place. Commencing at some convenient hour in the morning, the first urination should be into some other vessel and the urine thrown away, but on each subsequent occasion until the same hour next morning that there is inclination to make urine, empty the bladder into the special jar or vessel, keeping it tightly covered at all times between. From this vessel fill a perfectly clean six-ounce bottle, which should be corked tightly and a label put on it giving name, date and the total quantity passed in the twenty-four hours. Send this at once to the doctor. A teaspoonful of boracic acid will keep the contents of the jar from decomposing without affecting the urine from an examination standpoint.

Varicose Veins.—Owing to the unusual pressure on the blood vessels during pregnancy there is sometimes a swelling of the surface veins of the legs, which is known as "varicose veins." When this trouble occurs the patient should sit or lie down frequently, and when sitting should rest the feet on a stool or chair in order to relieve the pressure. In severe cases it will assist relief to wear a thin flannel bandage about the calves of the legs, bias strips of flannel three inches wide being sewed together to a length of eight yards. Bind the legs before rising, commencing to wind at the toes, but leaving the heels uncovered. Wind the bandage round and round the leg and well over the knee or higher if the veins of the thigh are affected. Usually it is well to have the doctor or nurse attend to this bandaging, and where the trouble persists in spite of these precautions the doctor should in any case be called upon to direct treatment.

Piles (Hemorrhoids).—This ailment is of the same nature as varicose veins, only in different location, being in the rectum. The trouble is aggravated by constipation and is augmented by straining at stools. The call to the closet should always be immediately obeyed, but if the bowels do not move readily do not strain, but use some simple laxative such as licorice powder, though in so far as possible the bowels should be regulated by laxative diet rather than by direct medication. The patient should lie down frequently while the trouble is severe, and oftentimes a pillow under the hips will afford relief.

Leucorrhea (the "whites").—This whitish discharge from the vagina is frequently due to the congestion of the vaginal walls resulting from pressure of the enlarging uterus on the blood vessels through which the blood is ordinarily returned to the general circulation. When this is the cause it is not usually serious though it may be very annoying. Douches sometimes relieve, but as a rule the doctor should be consulted before using this treatment.

Toxemia (Pregnancy Blood-Poisoning).—As pregnancy advances the mother is constantly receiving back into her blood an increasing quantity of waste matter from the growing child which must be eliminated as well as that which would naturally come from her own system. If the expectant mother's own nutritional processes are imperfect and she is unable to eliminate all these waste materials, a condition may result that may prove serious both for the mother and the child. This condition is called "Toxemia," and as its name implies, is a species of blood-poisoning. The following are some of the symptoms: Serious and persistent vomiting, repeated headaches, dizziness, puffiness about the face and hands, blurring of the vision or spots before the eyes, neuralgic pains, especially about the pit of the stomach, muscular twitching. It does not follow that any one of these symptoms nor all of them combined necessarily mean toxemia. They may be due to entirely different cause which may be removed without serious consequence of any kind. But when such symptoms appear they should be brought to the attention of the family physician, and it will be well to send him immediately a specimen of the urine, for the results of toxemia are so serious that they must not be overlooked, and if placed in the hands of competent physician at the beginning he will probably be able to remedy the ill before it gains undue headway. Many women are inclined to think that all such disturbances are a natural accompaniment of pregnancy and repeat the old adage that "a sick pregnancy is a safe one." There is no truth in this saying. If the pregnant woman is in healthy condition and carefully follows the rules for health laid down in this chapter, she will usually be free from most and sometimes all of the ills of pregnancy. Every pregnant woman should endeavor not only to be conversant with the necessary simple rules of health during pregnancy, but should strive to carry them out in every way. Guard unremittingly against continued constipation; avoid excessive quantities of meat; drink a liberal amount of water; take plenty of outdoor exercise and keep the house well ventilated day and night; bathe every day; wear loose, light, but suitably warm and com-

fortable clothing; get plenty of rest and sleep at least eight hours out of the twenty-four, and do not become overtired at any time; have the urine examined frequently and at stated intervals; strive to be happy, seek self-control, and *do not worry;* consult the doctor when symptoms of illness persist in spite of all precautions. Pregnancy is natural and it should be healthy.

Miscarriage.—The placenta and the uterus do not become firmly united until the eighteenth week of pregnancy, and hence it is that miscarriage is most likely to occur during these early weeks. The possible causes of this mishap are many. Oftentimes it is impossible to discover the true cause. Once having had a miscarriage, no matter what the cause, there is greater danger of another, and women thus sometimes get into uncontrollable habit of miscarriage. Among common causes the following may be mentioned: washing, sweeping, lifting, moving heavy articles, running a sewing machine and so forth, or it may result from amusements that cause too great bodily strain, as dancing, tennis, golf, horseback riding, hill climbing, jolting over rough roads in carriage or automobile, etc. It may be due to some imperfect development of the child in embryo, to some constitutional disease of the mother, to some abnormality in the uterus or to its misplacement. In these latter cases it cannot usually be avoided. In perhaps the majority of cases prevention lies in guarding against over-exertion during the first few months. When there has been previous miscarriage and so a possible tendency for it to again occur, a stay of several weeks in bed will sometimes avail when nothing else would. Such women should go to bed immediately there is any indication of bleeding or of abdominal pain. If it persists it is wise to send for the doctor, especially if pregnancy has advanced beyond the sixth week. Whether doctor is obtainable or not she must remain absolutely at rest until all trouble is over. If the miscarriage occurs before the sixth week it may appear to be nothing more than a severe menstrual flow, but it must be remembered that no matter at what period it may occur a miscarriage is an entirely different happening from a menstrual flow and certain dangers are always present. A fœtus, or in other words a child in embryo, has formed in the uterus and has come away in an unnatural way. Before a miscarriage can occur there must be a loosening of the fœtus (or unformed child) from the uterus. If this loosening is so slight that the life of the fœtus is not endangered, a miscarriage may oftentimes be averted by resting in bed. If in spite of this rest the bleeding continues it indicates that so much of the fœtus has been detached from the walls of the

uterus that miscarriage is almost certain to result. In such cases the doctor should be at once summoned and anything that has come away before his arrival should be saved for his inspection, that he may judge as to just what has occurred. To neglect a miscarriage, even at the earliest stage, may mean complete loss of health and years of suffering, while in many cases if it have the proper care of a competent physician at the time it may be deprived of ill results. Never regard a miscarriage as something that should be concealed. If it has come about in a natural way or by accident it is a matter calling for sympathy, not condemnation, and it is unjust to oneself to permit it to pass without the proper medical treatment.

PREPARATIONS FOR CONFINEMENT.

Doctor and Nurse.—The family physician should be told of the existence of pregnancy at as early date as possible. It is not only advisable that he should regularly examine the urine from the beginning; but if he has had the case under observation from the start he will be in much better position to deal with any untoward symptoms that may develop than he would had the case not been under his previous observation. It is well also to engage the nurse some time before the expected event, and it will usually be found advantageous to consult the doctor as to the nurse. The nurse should visit the home a few weeks before the expected date and make herself thoroughly familiar with the house and see that all necessities for the occasion are in readiness. As to the time a nurse will be required, cases vary, but she should remain at very least two weeks, and if possible four and in some cases longer. Many a case of life-long invalidism has resulted from the lack of suitable and sufficient care from doctor or nurse or both at confinement, and a few extra dollars spent on nurse and doctor at this time may save much greater expenditure later and perhaps save years of suffering.

Place of Confinement.—It is becoming more and more common for women to go to hospital to be confined. It is to be recommended in many ways. If any emergency occurs there are not only all appliances which may be required ready for instant use, but doctors and nurses to assist in any way that may be desired. In the matter of cost the hospital confinement will usually be cheaper than one at home, not only because of the saving in the matter of the many things it is necessary to get for a home confinement, but in the matter of the nurse, as at home there is not

only the nurse's salary, but her laundry and board. At the hospital the weekly amount paid includes the board of the patient, the routine care and all appliances of every kind that may be used. At the hospital ward nurses will usually be sufficient, but it is a great comfort to the mother and a help to the doctor if a special nurse is also engaged for the first two weeks, and where expenditure for such special nurse can be afforded it is to be advised. Many of course prefer confinement at home, and in such case everything must be gotten ready for the event a very considerable time in advance, and the importance of engaging a competent nurse must not be overlooked, for the best nursing that can be had is desirable for the woman in childbirth.

Supplies Needed.—For a confinement at home the following supplies should be on hand: Two to four pounds of absorbent cotton; one large package of sterile gauze (25 yards); two yards of stout muslin for abdominal binders; twelve old towels or diapers; two old sheets; two yards of bobbin or very narrow tape, for tying the cord. With these supplies the mother or nurse may make the necessary pads and bandages, which must be sterilized in accordance with instructions hereinafter given. The following further supplies should also be in readiness: one hundred bichloride of mercury tablets; four ounces of powdered boric acid; one bottle of white vaseline; one pound of pure Castile soap; one quart of grain alcohol; one douche pan; one stiff hand brush; one slop jar or covered enamel bucket; three pottery or agateware basins, one 16 inches and two 11 inches in diameter; at least three pitchers, each capable of holding a quart and upward; one and one-half yards of rubber sheeting, at least thirty-six inches wide, or one and one-half yards of white table oilcloth, to protect the mattress; one two-quart fountain syringe; one medicine glass; one medicine dropper; one drinking tube.

Sanitary Pads.—These are for the purpose of absorbing the discharges after delivery. They should be ten inches long and four inches wide, and one inch thick. They may be made of absorbent cotton, or for economy may be largely made of batting, but there must be a layer of the absorbent cotton on one side. Cut the sterile gauze into pieces the right size to fold around the cotton and extend two or three inches beyond it at each end. At least five dozen of these pads will be needed. They are pinned front and back to the abdominal binder, which is simply a strip of cotton cloth 12 inches wide and long enough to be fastened comfortably around the abdomen.

Delivery Pads.—Make two pads, each a yard square and four inches

thick. Cotton batting may form the principal part of the thickness, but there must be at least one inch top layer of absorbent cotton. Cotton waste if boiled in washing soda and thoroughly dried in the sun makes a cheap and effective filling in place of the batting, but as the texture is loose a thicker layer must be used. If necessary newspapers may be used both to protect the mattress and for the delivery pads, but for the latter must be covered with old sheets which have been sterilized.

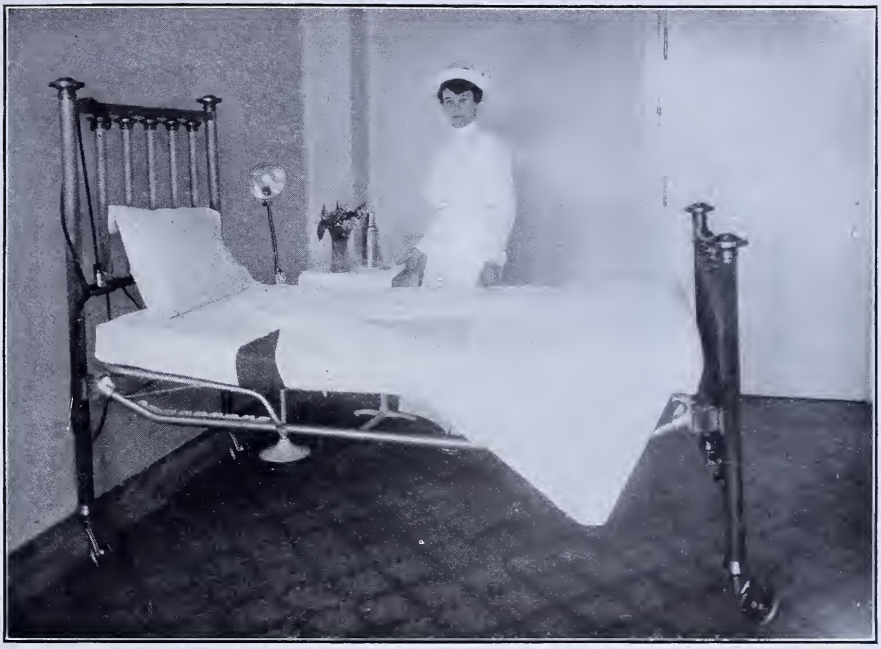
Gauze Sponges.—These are made by cutting sterile gauze into 15-inch lengths, the width of the gauze. One raw edge should be folded down about three inches, then double the strip by putting the selvage edges together, putting the raw edge of the fold on the outside. Fold this into thirds both ways and turn the sponge inside out so as to have all the raw edges inside. Two dozen of these pads will be required.

Cotton Pledgets.—These are wads of absorbent cotton about the size of an egg, having the ends of the cotton twisted into the roll. Make several dozen of these and keep them in a small pillowcase or cheesecloth bag.

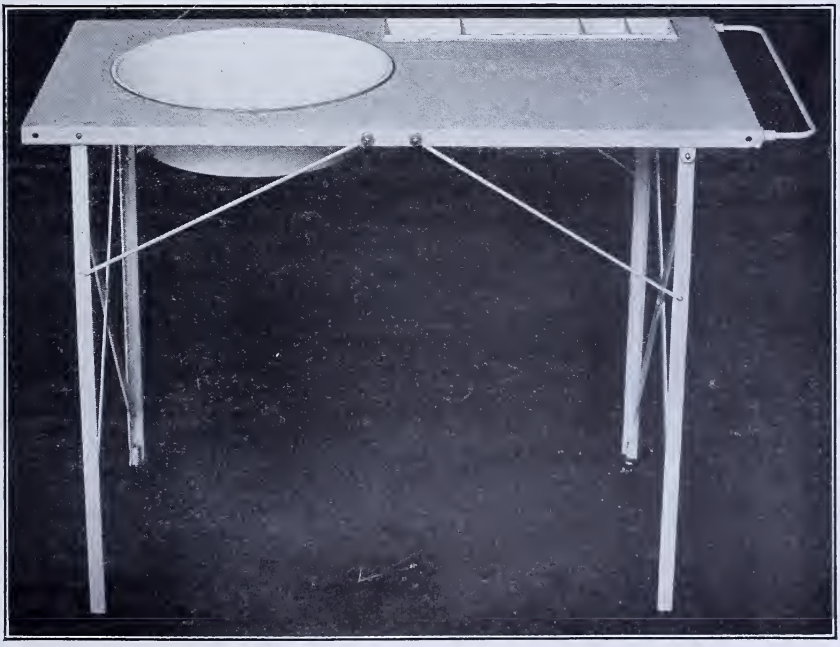
Gauze Squares.—These are needed to wash the baby's eyes and for other purposes. They should be cut out of the gauze in four-inch squares.

Bobbin.—Cut ordinary cotton bobbin into six 9-inch lengths for tying the cord.

Mode of Sterilizing.—Dressings may be sterilized in the oven, but there is danger of scorching, and, moreover, dry heat is less effective than moist heat, and it is therefore better to use steam. The smaller things may be sterilized in a large kettle or saucepan, and the larger ones in the wash boiler. For the first place a bowl upside down in the bottom of the kettle, using a bowl several inches high; put a plate on top of this bowl; put the dressings on the plate. For convenience in handling they may be placed in a cheesecloth bag. The water should just cover the bowl, but not the plate. Cover the kettle tightly. The articles should remain for a full hour after the water begins to boil. To sterilize in the boiler make a muslin hammock, somewhat longer than the length of the boiler, so that it will hang down about a third the depth of the boiler, and put the articles in this hammock, using great care in fastening the ends of the hammock to the boiler handles and making sure that it is so placed that the articles cannot tumble out. It will facilitate handling to first place the articles in a cheesecloth bag. The boiler should be filled about one-quarter full of water and after the water has come to the boil the articles should steam for a full hour, when they may be taken out and



Lying-in Room.



Bathing Table for Infants.

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Applying the Abdominal Binder.

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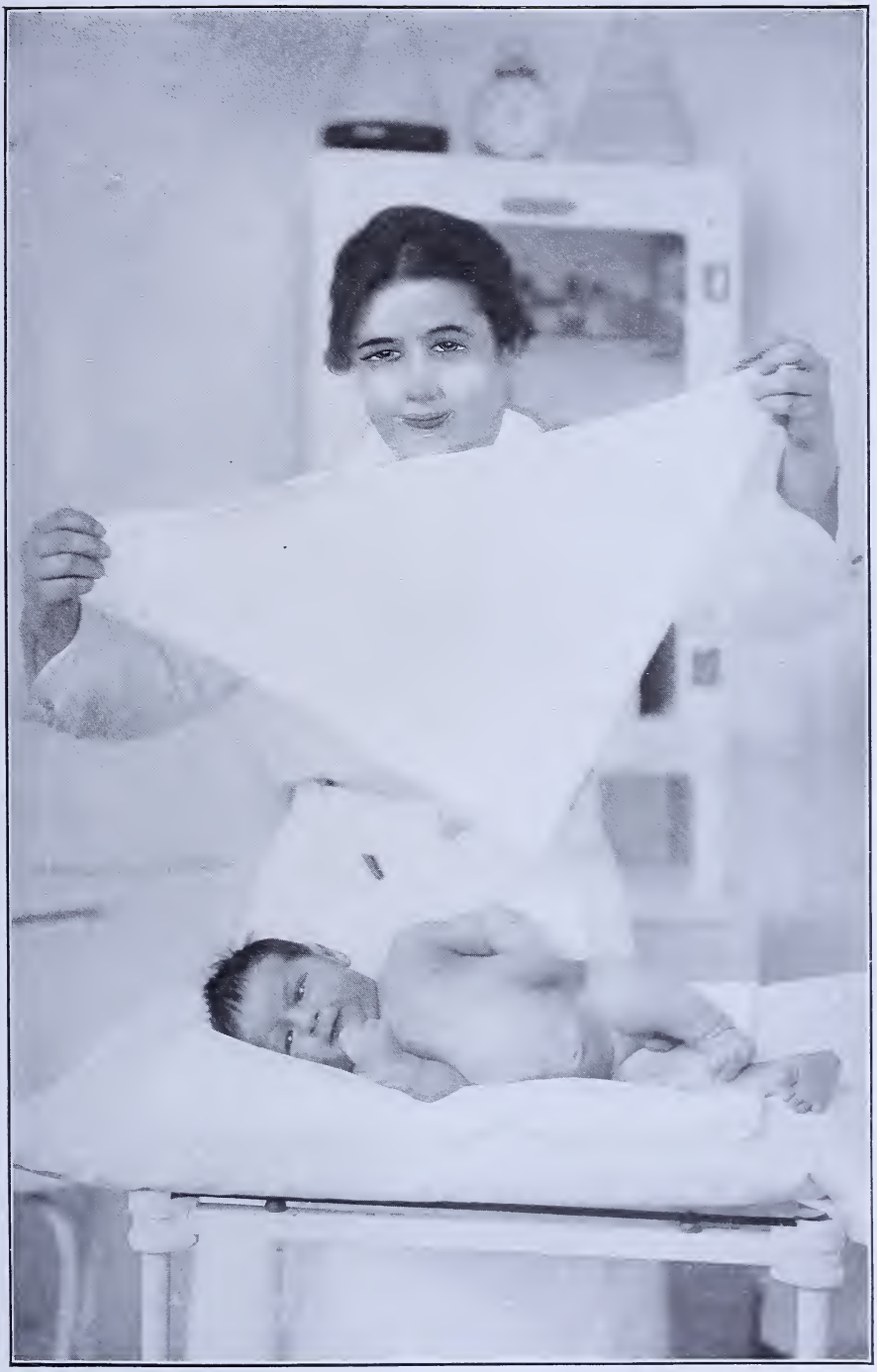

Folding the Diaper.

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Applying the Diaper.

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Bottle-fed Infant, 4½ lbs.

Same Infant three months after breast-feeding had been furnished—12 lbs.

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Proper position for breast-feeding.

To prevent the baby from taking your cold.

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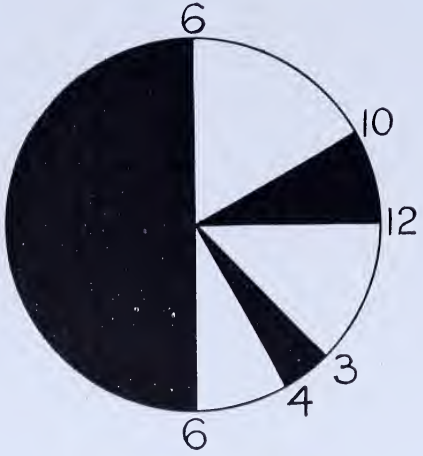
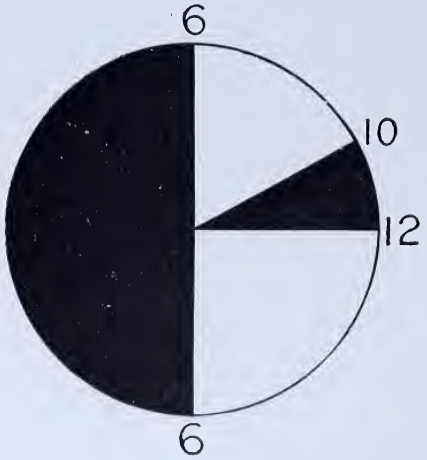
HOURS OF SLEEP

Black is time for sleep; white is time for baby to be awake to be washed, dressed and fed.

First six months.



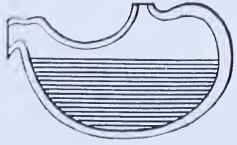
Six months to one year.



One year to two years.

HOURS OF FEEDING

Stomach of Child after Feeding.



End of first hour.

End of second hour.

End of third hour.

PROPORTIONS OF A HEALTHY CHILD'S BODY

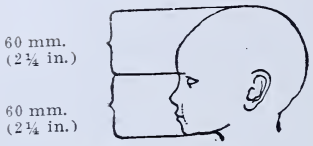
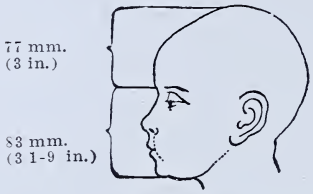


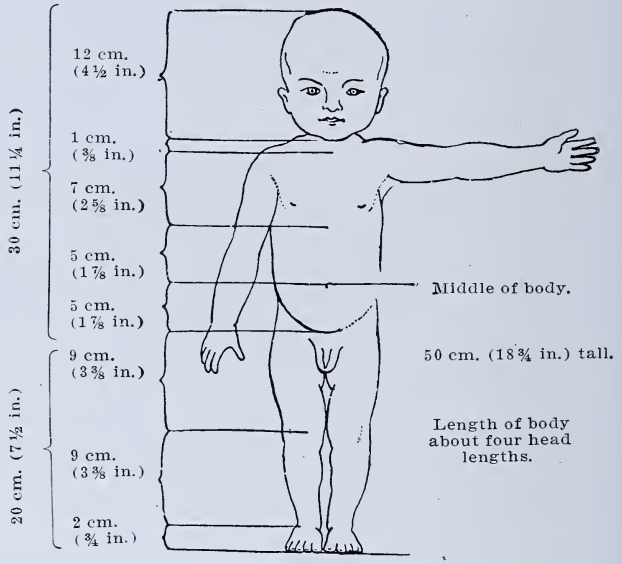
Fig. 437. At birth.

Length of head 12 cm. (4½ in.)
Lngth of face about half the length of head.



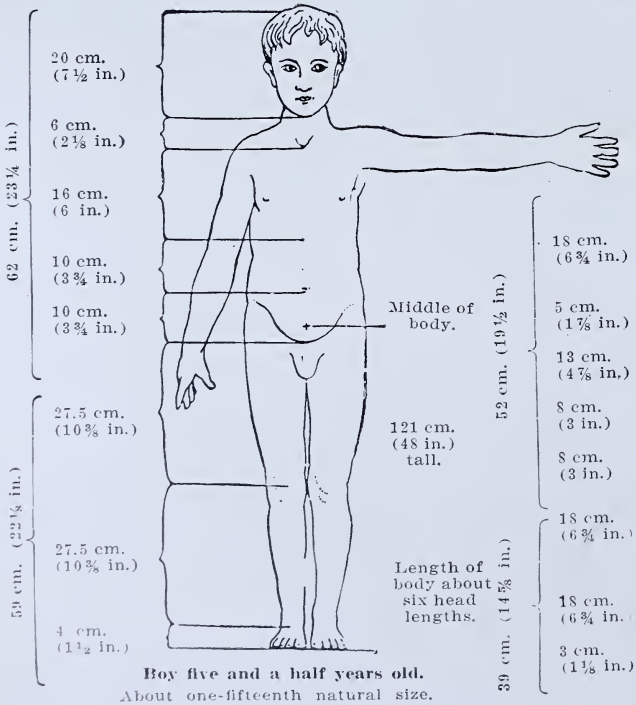
At age of one year.

Length of head 16 cm. (6 in.)
Length of face from one-thirteenth to one-twelfth larger than top of head.



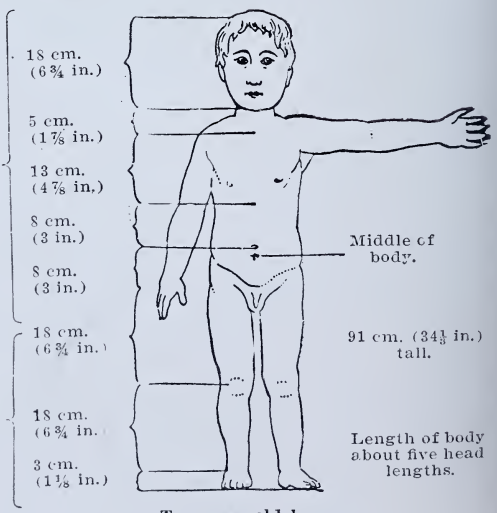
New-born boy.

About one-seventh natural size.



Boy five and a half years old.

About one-fifteenth natural size.



Two-year-old boy.

About one-fifteenth natural size.

dried. Sun-drying by hanging on clothes line is perhaps best way where possible, but they may be dried in the oven, great care being taken not to let them burn. They should then be put away in a perfectly clean drawer or other closed and suitable place, ready for use when required.

Confinement Room.—This should be the brightest and cheeriest room in the house. If possible it should be near a bath-room, and if there is a communicating room which can be used by the nurse and baby, it will greatly assist the mother in matter of rest. The room should be scrupulously clean and should be free from heavy draperies and upholstered furniture.

The Bed.—A single metal bed is to be preferred to the ordinary double bed, which is both too wide and too low. If low bed must be used, it will be well to raise it six or eight inches by putting strong, square blocks under the legs, first of course removing the castors so that there will be no danger of the bed slipping off the blocks. It is necessary that there shall be a good and comfortable mattress. If the mattress sags in the middle it should be remedied by placing three obstetrical boards—5 ft. by 12 in.—between the springs and mattress. The bed should be in such position that both the doctor and the nurse can get at it at the same time, and also it should be where the best possible light falls on it, especially at night, as light is of great importance in case stitching is necessary. A portable electric lamp is an excellent thing if it can be arranged.

CARE OF THE NEW-BORN INFANT.

While no one is herein advised to usurp the place of a physician or a skilled nurse in the lying-in room, yet, under peculiar circumstances, it may fall to the lot of some member of the family to act in an emergency as a nurse or even as a physician.

What to Do in Absence of Physician.—In such a case after the child has been born care should be exercised that no blood or fluid be drawn into the lungs during efforts to establish breathing. As soon as the child breathes well and cries lustily several times, the cord may be tied and cut in this fashion: Take a piece of strong heavy wrapping cord or a braided silk, a fishing line serves admirably, and tie the cord two fingers' breadth from the belly. Tie again further away and cut the cord between the two strings. Should the child not breathe well when born hold it up by the feet. This gives an opportunity for mucus and fluid to run out of its

mouth. Spank it gently. If the cord beats feebly cut it and remove the baby from the mother.

To Start Breathing.—If it has not yet begun to breathe souse its body quickly in cold or hot water. Immerse in hot and cold water alternately, frequently hang it head downward. Once the child breathes well or cries well roll it in a warm blanket or woolen shawl, lay it on its right side in a suitable place until the mother has been cared for as described in a previous chapter.

Bathing.—All strong, well-developed infants may be given a thorough cleansing bath soon after birth. If the child is covered by a white, cheesy substance it may be thoroughly greased with advantage. For this purpose pure olive oil is superior, although unsalted hog's lard or vaseline makes a good substitute. After rubbing this cheesy substance loose with the grease, give a soap and water bath. To give the bath the child should be laid across the lap on a blanket or large soft towel. The bather should wear a rubber apron and should have on a chair by her side a large basin of warm water and a bar of castile soap. A soft wash cloth or bath sponge may be used for the washing process. This completed, wrap the child in the towel and dry the skin by rubbing on the outside of the towel. Dry within all folds of skin very carefully. The entire body may now be dusted with baby powder: lycopodium, talcum or powdered starch.

Caring for the Eyes.—If the eyes are now properly cleansed that condition which mothers so dread, "sore eyes," may be avoided. They are best cleansed by dropping sterile boiled water in them by means of a new clean medicine dropper. A boric acid eye wash may be employed if the eyes seem to be inflamed at birth.

Boric acid	1 teaspoonful
Distilled water	5 ounces

Note.—Should the child be very weak or breathe feebly, it is well to postpone bathing or simply grease the child and wait until it is stronger before using soap and water.

Care of the Navel (*Umbilicus*).—Our grandmothers were wiser than they knew when they used singed linen to dress the umbilical cord and umbilicus (navel string and navel). We know that only sterilized dressings should be used about the navel. Among the best is sterile or borated cotton or sterilized gauze. If these cannot be had any piece of soft cloth or linen may be sterilized by baking in an oven for one-half hour and

handled only with clean hands. In dressing the cord it should first be washed clean with sterile or boiled water, then dusted with some antiseptic dusting powder. Boric acid is frequently used, although the following formula will be found more frequently used by physicians and obstetric nurses:

Salicyclic acid	1 part
Powdered starch	16 parts

Mix well and use as a dusting powder.

Applying the Dressing.—Your cloth or gauze may now be applied. Take a piece about four inches square, cut a hole in its center, pass the cord through and lay it upward and toward the left, add more dusting powder and fold in the edges of the dressing. The bandage may now be applied.

Dropping of the Cord.—The stump of the cord usually separates within a week, although it may remain longer. The rule is to allow it to drop off of its own accord. At any time when adjusting the bandage if the dressing is blood-stained or if pus is seen about the navel call the physician's attention to it at once.

The Bandage.—The bandage is applied to the infant's body for two reasons: First, to keep in place and to keep clean the dressings on the cord; second, to furnish support to the abdomen, and protect the intestines. During infancy the child uses all of its abdominal muscles at each breath, hence it is important that the bandage be pinned just snugly. If too tight it will interfere with breathing. It may, too, cause greater than normal pressure in the groins and hernia may result. The bandage should either be knit or should consist of a strip of flannel six inches wide and eighteen inches long. The bandage should be worn from three to six months.

Baby Clothes Prepared Before Birth.—One dozen white gowns for day.
One-half dozen woolen gowns for night.
Six abdominal bandages.
Six woolen undershirts.
One-half dozen knit socks.
One dozen large safety pins.
One dozen small safety pins.
One-half dozen large, soft towels.
Three or four baby wash-cloths.
Powder, powder-box and puff.

Two light, soft shawls.
Two dozen diapers.
Two flannel bathing aprons.
One rubber apron.

The Crib.—A crib is better than a cradle. It should be provided with a cheap mattress and a mackintosh, two soft blankets, two pillows, a washable comforter and a counter-pane. A good-sized clothes-basket with a large hair pillow makes an excellent crib for early infant life. It is especially useful when the child is weak, and artificial heat must be supplied.

THE CARE OF PREMATURELY-BORN CHILDREN.

Premature Birth.—Fright, accident or disease may cause the pregnant woman to deliver herself of her infant before term. Physical deformity of the mother may make it necessary for the physician to bring on labor some weeks before term. The care of infants born under such circumstances causes parents and nurse great anxiety. The lives of many such infants are sacrificed yearly because the average nurse (untrained) knows nothing of their care.

Incubation.—Every effort must be made to conserve the heat of the prematurely-born infants. To do this successfully, an artificial media must be supplied to take the place of the mother's womb. To speak figuratively, the "hatching" must be completed. Incubators are made for this purpose, and are for sale or for rent in every large city in this country. These incubators are planned similarly to the incubator in which chicken eggs are hatched. The great advantage of this apparatus, if successfully conducted, is a uniform high temperature can be obtained, and the moisture of the atmosphere accurately regulated. Feeding can also be done without disturbing the infant or allowing much heat to escape. However, in hospitals and elsewhere difficulty has been found in properly conducting child incubators and preference is now given to the "Basket Heat" method described in the following paragraph.

Basket Heat.—Take a large clothes-basket, line it with a double blanket, place on its bottom and stand around its sides a row of hot water bottles (beer bottles filled with hot water serve admirably), reline with another blanket, and place a thin pillow over the bottom row of bottles, and you have an improvised incubator that has saved the lives of many infants and gives greater opportunity for safeguarding the infant at all points.

Bathing and Clothing.—Prematurely-born infants must not be given a general bath. The face, if soiled, may be cleansed. The entire body should be greased with olive oil, lard or vaseline. The cheesy substance wiped off with cotton. The entire body, except around the anus and face should then be sheathed in carded lamb's wool or raw cotton, and around the whole, a bandage. A bunch of cotton may be placed over the anus, to receive urine and feces.

Temperature.—The infant must now be provided with a high, even temperature, varying from 95 degrees to 85 degrees Fahrenheit, depending upon how weak it is when born. No other clothing is required, except a blanket cover. This temperature can be accurately maintained with the incubator, or approximately maintained with the basket properly and skillfully manipulated.

Feeding.—It is frequently impossible for the premature child to suckle at the mother's breast, but diligent effort should be made in this regard. If the act cannot be performed then the mother's breast should be pumped, and the milk thus gotten kept warm by placing in a cup standing in warm water. It should be given to the infant as soon as possible after being drawn. It is best given by means of a medicine dropper. Where the mother has no milk, milk may be prepared as per formula for modified milk, and then dilute it one-half with sterile water. Only a few teaspoonfuls can be given at a feeding, but the feeding should be more frequent than with the child born at regular time—say once an hour. The infant must be kept by its artificial heat, or in the incubator while this is being done. It may even be fed without waking.

General Directions.—Such infants sleep almost continuously, and cry usually when too cold. When too hot they will be seen to be restless, and to breathe rapidly. These observations must guide in regulating temperature. Should stimulants be required, the physician will direct the kind of stimulation and dose. The child must not be removed from its wool or cotton suit for a soap and water bath until such time as it would have been at term if unborn, and not then unless it appears to have gained strength.

To remove soiled cotton about anus, do so by turning child on its side; remove cotton, wipe off buttocks with moist cloth; replace fresh cotton, and turn child back as before. Do not drag a prematurely-born child out of the incubator or basket to nurse it or to show it to inquiring friends.

INFANTS OF NORMAL BIRTH.

Infant Bathing.—An infant should be regularly bathed from head to foot once a day. The outfit for the baby's bath should consist of an infant bath table, bath thermometer, washcloths, soap, oil, powder and towels. The tub and table should be of white enamelware.

A bath thermometer should be used to determine the temperature of the water. Squares of cheesecloth or soft turkish toweling should be prepared—a dozen each time—to be used as washcloths.

By no means use highly scented soaps, they contain chemicals that irritate the skin. Imported castile is the best. Wet the baby's head before putting into the bath. This is to guard against congestion. Burnt flour should be used in case of chafing. Be careful to guard against draughts and bathe the child near an open fire, if possible—if not, the bath should be given in a perfectly warm room. Have the clothing hanging at the fire, well warmed and ready to put on at once. The petticoats should be put one in the other, and the dress over them, so that all three may be slipped on at once. Every little waist should be furnished with buttons or button-holes and with drawing-strings at top and bottom for drawing to the proper size.

A large turkish towel should be laid upon the table and the baby wrapped in it as soon as removed from the tub. Two small linen towels are necessary—one for the face, the other for drying the creases between the thighs.

Care of the Mouth.—The mouth of the nursing child should be gently cleansed several times a day with a piece of soft linen dipped in boiled water or boric acid solution. The mother's or nurse's hands must be clean when washing the baby's mouth. It is particularly important to keep the breast-fed baby's mouth clean, lest the baby infect the mother's nipple, and sore nipples or even breast abscesses result. It is equally important during teething. It is to be remembered, however, that too frequent washing of the baby's mouth may rub off some of the natural mucous membrane and give opportunity for entrance of germs, and it is also to be kept in mind that it is equally important that the mother's nipples be kept constantly clean and that they be antiseptically washed just before each nursing, as otherwise the child's mouth may become diseased from the mother's nipples.

Care of the Genital Organs.—It is of the greatest importance to begin in early infancy an intelligent inspection and cleansing of the genital

The Old Way.

The Infant Bath Table.

A turkish towel should be laid upon the table.

Applying the Diaper and Abdominal Bandage.

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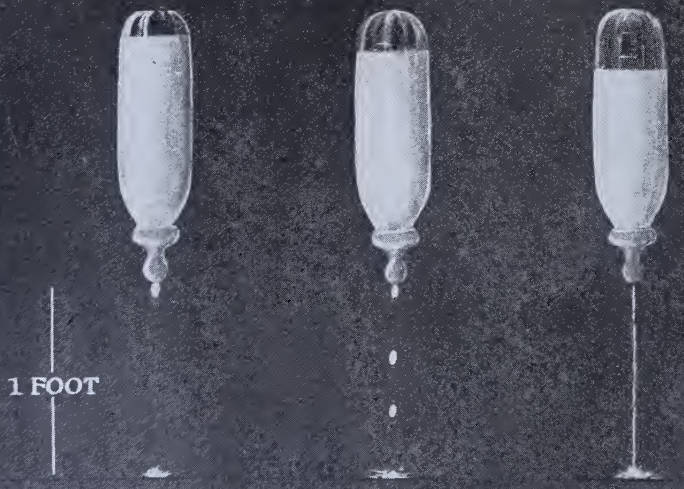
Look through each nipple before you buy it. You should barely be able to see light through the hole in the nipple. It is easy to make a hole larger with a red hot needle point, but you cannot make it smaller.



Very Slow Nipple.

When bottle of milk is held upside down, one foot above table, one drop will strike the table just as the next one leaves the nipple.

Too slow

Medium Slow Nipple.

Under same conditions, there will be 2 or 3 drops between nipple and table.

Just right.

It should take from 10 to 20 minutes for emptying the bottle.

Fast Nipple.

Milk flows from nipple in small but continuous stream.

Too Fast.

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organs. With boys the penis should be examined; the foreskin drawn back over the shaft of the penis; any secretion beneath the skin should be removed with a soft cloth and warm water. The skin should then be drawn forward again as soon the the cleansing has been completed. If this precaution is not observed the penis may become swollen to such an extent that it may become impossible; if the foreskin cannot be withdrawn over the penis the boy should be circumcised. Proper cleansing beneath the foreskin will prevent, or often cure, bed-wetting; will prevent premature erections; playing with the penis, and masturbation.

Caring for the vulva and clitoris in girls is equally important, but much simpler to do. It prevents the formation of habits not alone loathsome and disgusting, but augurs for the future health of the child.

Care of the Eyes.—It is well to cleanse the eyes of the new-born infant as directed in giving its first bath. Its eyes may be advantageously cleansed with sterile water, or boric acid solution used from a dropper several times a day for some days after birth. It is not necessary to use medicine or eye washes in the baby's eyes to strengthen them; but during the first three months, when but few tears are secreted, the eyes may be cleansed as above, when dust or dirt of any sort gets into them.

The abominable custom of mothers and nurses taking babies out in carriages without sunshades, allowing the child to lie on its back with the sun beaming on the baby's face, cannot be too strongly condemned.

CLOTHING FOR THE INFANT.

Quality and Quantity.—The quality and quantity of the child's clothing must be regulated by the means of its parents. Every mother will probably have the best she can afford, but, whether rich or plain, it should be carefully made; all seams felled, and no rough edges left to chafe the tender skin. Six of every garment—three night flannels and three for day—constitute the minimum layette. Twelve diapers may answer, by careful management, but unless they can be washed every day at least eighteen will be required. A flannel cape or a woolen shawl is necessary to throw around the child in passing from one room to another during the first weeks of its existence. Summer and winter, until it is two years old, it should wear a flannel shirt long enough to cover the abdomen.

Warmth Required.—During the early months of the child's life, warmth is peculiarly needful for the infantile system, and where there is any tendency to weakness and imperfect development of animal tem-

perature, flannel clothing is particularly necessary to favor the accumulation of warmth in the infant's body. Benefit may also result from its gentle stimulating action upon the cutaneous surface. In hot weather muslin may be used instead of flannel, but even then a careful mother or nurse will change at once the clothing to suit the varying states of the weather. In summer infants are not infrequently kept too warm by too thick and warm coverlids while sleeping.

The Rubber Diaper.—The rubber diaper has many friends and many foes, and there is much to be said on both sides. If the nurse is careful it will be found a comfort, since it keeps the clothing dry and can do no harm except where it is made an excuse for not changing the child as frequently as is necessary. When it is used there should be two or three, and they should be frequently aired. Wash them always in cold water and wipe on a towel; then hang them in a cool place to dry. When the baby's skin is very delicate their use may cause chafing, unless great care is taken; this is the only valid objection urged against them.

Dress for an Airing.—When the child is sent out for an airing, which may be done in two weeks after birth in summer and in a month's time in winter if the weather is good, and in midday, be sure that it is well wrapped. A knitted worsted spencer, buttoned behind, for wear under the cloak, and a shawl over all if the weather is cool, will protect the little one from harm.

When to Shorten the Clothes.—The proper time for "shortening" the clothes is about the end of three months in summer, or six months in winter. This shortening should be only of the extra length, being still long enough to extend below the feet for nearly a year, to protect the lower parts of the body against changes in temperature. By the end of a year the feet should be entirely free, so as to allow free motion of the legs.

Danger of Wet Clothes.—The child should be kept dry as possible. Wet diapers or stockings, when permitted to remain on the child for some time, give rise to bowel and febrile complaints. They tend to cause excoriations and painful irritation of the skin about the groin and buttocks. Examine frequently the underclothing of a child, and if any part be found wet, immediately replace it with clothing that is dry and clean.

Abdominal Bandages.—Many advise the continuance of these throughout the first year and even longer. This, however, is not absolutely essential. In cold weather they should be retained for at least three months, but in hot weather may be abandoned at end of the first or second month.

INFANT FEEDING.

Obstacles to the Mother's Nursing.—Circumstances ofttimes arise when the mother cannot, or should not, nurse her infant. Disease of mother or child, a poor development of breasts or nipples and absence or lack of milk development, or even the premature birth of child may prevent breast feeding. It is always best for mother and child to continue breast feeding at least a few weeks unless forbidden by the physician.

Breast Feeding.—The infant should be applied to the breast six or eight hours after birth, and four or six times a day thereafter, until milk formation is fully established. This accomplished the mother must establish regular hours for feeding. From 6 A. M. to 10 P. M. she should nurse it every two hours, and through the night period every three hours (see special table in regard to feeding). The nipples as well as the child's mouth should be cleansed carefully with a boric acid solution before nursing, and cleansed with pure water afterward. A scarcity of mother's milk must be met with tonics and nourishing food.

Wet-Nursing.—When a mother cannot nurse her child, a competent wet-nurse is most desirable. She should be known to be free from bad habits; to be moral; to be even tempered; to be clean and free from disease. There ought not to be a period of more than two or three months between the age of her babe and the one to be nursed. The same hours for feeding night and day should be exacted of her that the mother should give.

Mixed Feeding.—Where a mother's milk is not sufficient in quantity it is wise to continue nursing at night and several times during the day. At the other nursing periods give modified cow's milk, or some infant food prepared for a child of the same age, bottle-fed.

Artificial Feeding.—Artificial feeding of infants has undergone such complete changes in recent years that the advice of elderly mothers and grandmothers cannot be depended upon. Now that we know many kinds of germs infect milk as brought from the dairy, sterilization must be insisted upon. Now that many men in every large city devote their time exclusively to infant disease and infant feeding we have gotten out of the rut in which physicians, mothers and nurses formerly trod. Manufacturers of infant food found it necessary to so modify methods of preparation that their finished products would harmonize with proven ideas.

Modified Cow's Milk.—In the hands of an intelligent mother or nurse

the home modification of fresh cow's milk is, next to mother's milk, the best infant food.

The following comparative table will help the better to understand why the various dilutions of milk are made:

MILK FROM NURSING MOTHERS.

Fat	4	per cent.	
Sugar	7	"	
Proteid	1.5	"	Total solids ..... 12.65 per cent.
Ash	.15	"	
Water			87.35 "
Reaction			Persistently alkaline

MILK FROM A SOUND COW.

Fat	4.04	per cent.	
Sugar	4.55	"	
Proteid	4.15	"	Total solids ..... 13.45 per cent.
Ash	.71	"	
Water			86.55 "
Reaction			Feebly acid

What the Above Tables Tell.—From the above tables it will readily be seen why cow's milk alone is not a suitable food for infants. It will be seen that normal cow's milk has about the same proportion of fat as human milk; that it has much less sugar; that it has nearly three times as much proteid substance, and that the percentage of ash, or mineral matter, is far too high. Add to these facts the well-known truth that the proteid of cow's milk is more difficult to digest than that of human milk, and you have sound reasoning for modifying cow's milk, as shall be directed hereafter.

A perusal of the table analysis of colostrum, the first secretion in the human breast, should now be made.

ANALYSIS OF COLOSTRUM OR FIRST MILK.

(The breast secretion before milk is formed.)

Fat	1.71	per cent.	
Sugar	4.90	"	
Proteid	1.72	"	Total solids ..... 9.12 per cent.
Ash	.79	"	
Water			90.88 "

Meaning of Above Table.—From this table the careful reader will see how little fat the infant gets during its first days after birth. The infant fed artificially should be given such a modified milk that its chemical analysis will approximate first colostrum, later human breast milk, and still later, human breast milk plus its enrichment by the mother eating large quantities of rich, highly nutritious food.

Medical Method.—In large cities, and where families can afford the expense, this is easily done by the physician. He just writes a prescription similar to the above table, adding the amount of food wanted at each feeding and the number of feedings per day. This prescription is then sent to the milk laboratory where it is accurately and scientifically prepared just as medicine is compounded in a pharmacy. This method is expensive and can only be used by those who need not consider cost.

Home Method.—This method may be closely approximated, however, at home by using a list of tables very carefully worked out experimentally. In these tables the cream used has been skimmed cream of a twelve hours rising. No ash or mineral matter allowed for except that in water.

First and Second Week.

Chemical Formula.			*Home Formula.*		
Fat	2	per cent.	Cream	4	ounces
Sugar	5	"	Milk	0	ounces
Proteid	.75	"	Milk sugar	6	teaspoonfuls
Water	92.25	"	Lime-water	1	ounce
			Water	15	ounces

Third Week.

Fat	2.5	per cent.	Cream	5	ounces
Sugar	6	"	Milk	0	ounces
Proteid	1	"	Milk sugar	7½	teaspoonfuls
Water	90.5	"	Lime-water	1	ounce
			Water	14	ounces

Fourth to Sixth Week.

Fat	3.5	per cent.	Cream	6	ounces
Sugar	6	"	Milk	1	ounce
Proteid	1	"	Milk sugar	7½	teaspoonfuls
Water	89.5	"	Lime-water	1	ounce
			Water	12	ounces

Sixth to Eighth Week.

Fat	3.5	per cent.	Cream	7 ounces
Sugar	6.5	"	Milk	1 ounce
Proteid	1.5	"	Milk sugar	8½ teaspoonfuls
Water	88.5	"	Lime-water	1 ounce
			Water	11 ounces

Second to Fourth Month.

Fat	4	per cent.	Cream	8 ounces
Sugar	7	"	Milk	1 ounce
Proteid	1.5	"	Milk sugar	9 teaspoonfuls
Water	87.5	"	Lime-water	1 ounce
			Water	11 ounces

Fourth to Tenth Month.

Fat	4	per cent.	Cream	8 ounces
Sugar	7	"	Milk	2½ ounces
Proteid	2	"	Milk sugar	8½ teaspoonfuls
Water	87	"	Lime-water	1 ounce
			Water	8½ ounces

Tenth to Twelfth Month.

Fat	4	per cent.	Cream	8 ounces
Sugar	7	"	Milk	5 ounces
Proteid	2.5	"	Milk sugar	7¾ teaspoonfuls
Water	86.5	"	Lime-water	1 ounce
			Water	6 ounces

FOR WEANING.

Fat	4	per cent.	Cream	8 ounces
Sugar	5	"	Milk	7½ ounces
Proteid	3	"	Milk sugar	6 teaspoonfuls
Water	88	"	Lime-water	1 ounce
			Water	3½ ounces

Why Lime is Added.—In these mixtures the lime-water is added to preserve the alkalinity of the milk as well as to add lime salts for the food. Where the water used comes from lime rock beds it will not be necessary to add so much lime-water. In such cases, and, indeed, in many cases weak barley-water or arrow-root-water agrees better with the infant than plain water.

HOW TO PREPARE A DAY'S FOOD.

Consult the table for intervals of feeding and quantity to feed; for example: a four weeks old baby. It will be seen that nine feedings by day and one feeding by night is advised. Each feeding consists of one and a half to two ounces of food. A glance shows that from fifteen to twenty ounces are required for twenty-four hours. Make up the food as follows from table fourth to sixth week:

Cream	6	ounces
Milk	1	ounce
Milk sugar	7½	teaspoonfuls
Lime-water	1	ounce
Water	12	ounces

Dissolve the milk sugar in the water, add lime-water, milk and cream; mix thoroughly in vessel and divide in ten nursing bottles. Plug each bottle with clean cotton and stand in a kettle of warm water. Place the kettle over the fire, keeping the water boiling twelve to fifteen minutes. Do not allow the food to boil. Remove the nursing bottles and place in a cool place until ready for use. When ready to feed the baby take a bottle, stand in lukewarm water until heated, remove cotton, and place over the bottle a freshly scalded nipple and you have a sweet, clean, sterile infant food.

Nursing Bottles.—Bottles of medium size and round, with flat bottom and small, short necks are best. Rubber nipples which slip over the neck of the bottle are the only safe nipples to use. All nursing bottles having rubber tubes and nipples are dangerous, dirty and should not be used. All bottles must be cleaned as soon as empty and again before refilling they must be cleansed with boiling water. The nipples must be turned, cleansed with soap and water and boiling water and may then be kept in boric acid solution until ready for use.

This cleansing of the nipples and bottles is very important and should be conscientiously attended to. Sometimes nurse maids, through carelessness, neglect to do this, and the so-called milk infection, which generally results from unwashed bottles and dirty nipples is likely to follow.

TABLE SHOWING FEEDING HOURS AND QUANTITIES.

Age.	Interval hours by day.	Interval hours by night.	Number of day feedings, 6 A. M. 10 P. M.	Number of night feedings, 10 P. M. 6 A. M.	Number of feedings in 24 hours	Amount at each feeding.	Total amount in 24 hours.
1 Week	2	3	9	2	11	1 oz.	10-11 oz.
2 "	2	3	9	2	11	1 to 1½ "	11-14 "
4 "	2	4	9	1	10	1½ to 2 "	15-20 "
6 "	2	4	9	1	10	2½ "	25 "
8 "	2½	4½	7	1	8	3½ "	28 "
3 Months	2½		7		7	4 "	28 "
4 "	2½		7		7	4½ "	31 "
5 "	3		6		6	5½ "	33 "
6 "	3		6		6	6 "	36 "
7 "	3		6		6	6½ "	39 "
8 "	3		6		6	7 "	42 "
9 "	3		6		6	7½ "	45 "
10 "	3		6 or 5		6 or 5	8 or 9½ "	48 "
11 "	3		5		5	9½ "	48 "
12 "	3		5		5	10 "	50 "

This table shows equally well the hours and intervals to feed a breast-fed baby.

Condensed Milk.—Condensed milk fattens babies to an abnormal extent, and while they are fat and plump, experience shows that they are too weak to withstand any trifling disease. It is a poor permanent food. It does have a useful place in infant feeding. While traveling or during the night in hot weather, it is an excellent substitute for the regular food. It should be made up for a single feeding at a time. For a child three months old:

Condensed milk	2½	half-teaspoonfuls
Water	2	ounces
Lime-water	2	teaspoonfuls
Salt		a small pinch

This quantity may be increased or decreased according to the age of the child.

Weaning Time.—The age at which a child may be weaned has been suggested to be some time between the eighth and fourteen month. Much depends upon mother, child, surroundings and season. A strong child may be weaned early. It is best to avoid weaning in summer. If the mother or nurse cannot attend personally to preparing the food, and

keeping bottles and food scrupulously clean, it is wise to continue nursing even the full fourteen months.

Gradual Weaning.—If the child is weaned early, do it gradually by substituting some artificial food. If late, the mother may stop the breast at once, and the child will experience little difficulty in transferring to some other food. Should the mother again become pregnant, she must wean her infant.

RULES FOR MANAGING THE INFANT DURING THE SUMMER MONTHS.

The great increase of sickness and death among young children during the summer months is due largely to ignorance on the part of mothers and nurses. Attention to the following rules would save many a life:

1. Bathe the child once a day in tepid water. If it is feeble, sponge it all over twice a day with tepid water, or with tepid water and vinegar.

2. Avoid all tight bandaging. Make the clothing light and cool, and so loose that the child may have free play for its limbs. At night undress it, sponge it, and put on a slip. In the morning remove the slip, bathe the child, and put it in clean clothes. If this cannot be afforded, thoroughly air the day clothing by hanging it up during the night. Use clean diapers, and change them often.

3. The child should sleep by itself in a cot or cradle. It should be put to bed at regular hours, and be early taught to go to sleep without being nursed in the arms. Without the advice of a physician never give it any spirits, cordials, carminatives, soothing syrups or sleeping drops. Never quiet it by candy or cake; they are the common causes of diarrhœa and of other troubles.

4. Give the child plenty of fresh air. In the cool of the morning and evening send it out to shady places. Whenever it seems to suffer from the heat, let it drink freely of ice water.

5. Keep your house sweet and clean, cool and well aired. In very hot weather let the windows be open day and night. Correct all foul smells by pouring into the sinks and privies carbolic acid or quick-lime, or the chloride of lime, or a strong solution of copperas. These articles can be got from the nearest druggist, who will give the needful directions for their use.

6. Breast milk is the only proper food for infants. If the supply is ample and the child thrives on it, no other kind of food should be given while the hot weather lasts. If the mother has not enough, she must not

wean the child, but give it, beside the breast, modified cow's milk. Nurse the child once in two or three hours during the day, and as seldom as possible during the night. Always remove the child from the breast as soon as it has fallen asleep. Avoid giving the breast when you are over-fatigued or over-heated.

7. If, unfortunately, the child must be brought up by hand, it should be fed on a milk diet alone—that is, warm milk out of a properly sterilized nursing-bottle. Modified cow's milk is the best. If the child thrives on this diet, no other kind of food whatever should be given while the hot weather lasts. At all seasons of the year, but especially in summer, there is no safe substitute for milk, if the child has not cut its front teeth. Sago, arrow root, potatoes, corn flour, crackers, bread, every patented food, and every article of diet containing starch, cannot, and must not, be depended on as food for very young infants.

8. Buy only whole milk known to be of good quality. Prepare either modified cow's milk or artificial foods exactly as directed under infant feeding. Keep bottles of food in a cool place, on ice, or if in the country and without ice lower a basket containing the filled nursing bottles in a well near the surface of the water. It is best to have the milk delivered during the early morning and have it prepared and sterilized before the day becomes hot.

9. If the milk should disagree, one-half to one tablespoonful of lime water may be added to each bottleful. Whenever pure milk cannot be gotten, try the condensed milk, which sometimes answers well. It may be prepared by adding to ten tablespoonfuls of boiling water, without sugar, one tablespoonful or more of the milk, according to the age of the child. Should this disagree, a teaspoonful of arrow root, sago or cornstarch may be cautiously added to a pint of the milk. If milk in any shape cannot be digested, try, for a few days, pure cream, diluted with three-fifths or four-fifths of water—returning to the milk as soon as possible.

10. The nursing-bottle must be kept perfectly clean; otherwise the milk will turn sour and the child will be made ill. After each meal it should be emptied, rinsed out, taken apart and the nipple and bottle cleansed in boiling water and placed in clean water, or in water to which a little soda has been added. It is a good plan to have eight or ten nursing-bottles, and to use them by turns. Then when food is prepared for the day each feeding can be placed in a bottle and kept ready for use in some cool place or in the refrigerator. The best kind is the plain bottle with a rubber nipple and no tube.

Wrong Way to Hold the Baby.

Right Way to Hold the Baby.

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Feeding the Baby.

Quieting the Baby.

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11. Do not wean the child just before or during the hot weather, or, as a rule, until after its second summer. If suckling disagrees with the mother she must not wean the child, but feed it, in part, out of a nursing-bottle, on such food as has been directed. However small the supply of breast milk, provided it agrees with the child, the mother should carefully keep it up against sickness; it alone will often save the life of a child when everything else fails. When the child is over six months old, the mother may save her strength by giving it one or two meals a day of modified cow's milk or some prepared infant food put into a nursing-bottle. When from eight months to a year old, it may have also one meal a day of the yolk of a fresh and rare-boiled egg, or one of beef or mutton broth, into which stale bread has been crumbled. When older than this, it can have a little meat finely minced; but even then milk should be its principal food, and not such food as grown people eat.

12. The moment a diaper is soiled it should be removed and washed in water containing a small quantity of soda. Do not let diapers stand in soiled state. Before using again they must be thoroughly dried and care taken that all soda is removed.

13. When the baby is breast fed the mother must be very careful in regard to her nipples. Keep them clean by washing them with a mild solution of boracic acid and water both before and after each nursing (the water should be cool). The mother's bowels should move at least once daily as constipation with her deleteriously affects the child. Eat plain, well-cooked food. Drink plenty of pure water between meals, but avoid beer and other alcoholic drinks, as their reflex action on the child is bad. Use tea and coffee sparingly. Get all sleep possible. A restful mother makes a restful child. Take reasonable exercise, be in the open air as much as possible and be sure that living and sleeping rooms are properly ventilated.

14. The following is recommended as to the feeding of breast-fed babies:

(a.) From birth to three months.—Nurse the baby for fifteen minutes every two and one-half hours. No child should be nursed more than nine times in twenty-four hours.

(b.) From third to sixth month.—Nurse baby twenty minutes every three hours and not more than eight times in the twenty-four hours.

(c.) From sixth to ninth month.—Let the child nurse every three hours.

(d.) From ninth to twelfth month.—Let the child nurse every three and one-half hours.

Putting these instructions in tabulated form we have the following:

Age	No. of Nursings	Intervals of Nursing	Night Nursing 10 P.M. to 7 A.M.	Duration of Nursing
Birth to 3 months	9.....	2½ hours.....	2.....	Not over
3d to 6th month .....7 to	8.....	3 hours.....	2.....	15 or 30
6th to 9th month	6.....3 to	3½ hours.....	1.....	Minutes
9th to 12th month	5.....	3½ hours.....	1.....	

DEVELOPMENT OF THE CHILD.

Mothers, nurses and friends are often badly misinformed as to what constitutes a healthy, normal, full-term child, and often know less about what should be its natural development.

Weight.—The average weight of infants at birth is six and one-half pounds for a girl and seven and one-half pounds for a boy. Of course, great variations from this may occur. Children have weighed at birth but two and three-fourths pounds and have lived to develop into strong manhood, while, on the other hand, children have been born weighing as much as twenty-two pounds. During the first week after birth the infant loses steadily in weight. Sometimes a full pound is lost, usually not more than a half pound. After the first week there should be a steady gain of two to four ounces each week. The baby should frequently be weighed, and if it does not increase in weight some change of food should be made.

Length.—The average baby at birth measures twenty inches in length. At six months it should be twenty-four inches. At birth the trunk is longer in proportion than the body. The first growth is largely in the length of the legs. Growth usually occurs in cycles. While gaining rapidly in weight little is gained in length. While teething, or immediately after, the growth in length is marked.

General Development.—The fat, flabby child, such as we see when bottle-fed with condensed milk, or occasionally when breast-fed, is not a healthy child. An acute illness will be badly borne. Rickets, bow-legs and delayed teething are noted. The healthy child has pink skin, rounded limbs, with firm muscles. It is not necessarily fat. It is always active when awake.

Periods of Development.—For convenience the child's life may be considered as consisting of three periods: The first period extending

from birth to the beginning of teething; the second, that of teething (milk teething); the third extends from the first teething to the end of the second teething.

Durings the first period breast milk is the ideal food. At this time babies cannot digest starchy foods, hence all table food, bread and the like must be withheld. During the second period saliva is formed in the mouth and occasionally good broths may be given. During the third period the digestive apparatus is prepared for more complex food. See Special Diet Lists.

Exercise and Air.—Almost as important as food and bathing is that of exercise and air for the growing infant. Exercise for its muscular system can be secured by massage after the bath, and by dressing in such a way as to give the child the freedom of its limbs. It is of great importance that the child be taken in the fresh air and sunshine as much as possible. Only in inclement weather should this be neglected. A baby carriage is desirable for this purpose. A sun-bath given with the nude baby on a pillow inside a sunny window in winter and in the fresh air in summer is healthful. Nurseries should be large, airy and well ventilated, and should be located on the sunny side of the house. The heating plant should be so managed as to give an equal temperature of 72 degrees, with fresh outside air entering at all times.

TEETHING OR DENTITION.

Time of Teething.—The most usual age for an infant to begin teething is from the sixth to the eighth month. This is only a general rule. Bottle-fed babies, delicate infants and children with rickets, teethe later than the eighth month. Precocious infants may teethe much earlier. Children are occasionally born with one, two or more teeth; others have no teeth until the eighteenth month.

How the Teeth Come.—The lower central incisors usually appear first, and in a few weeks the four upper incisors follow. From the twelfth to the fourteenth month the remaining lower incisors and the premolars come through. There is a long delay preceding cutting of the incisors. They appear from the eighteenth to the twentieth month. The remaining molars appear about two and a half years of age. The full set of milk teeth numbers twenty, ten in each jaw. The accompanying diagram shows their appearance most graphically. It also shows the full set of teeth and the age at which they appear.

Convulsions.—Dentition is a physiologic process and should cause no serious disturbance to the health of the child. It is true that there may be considerable irritability of temper, and resulting from it some digestive disturbance. The dreaded convulsions of teething are very much overrated.

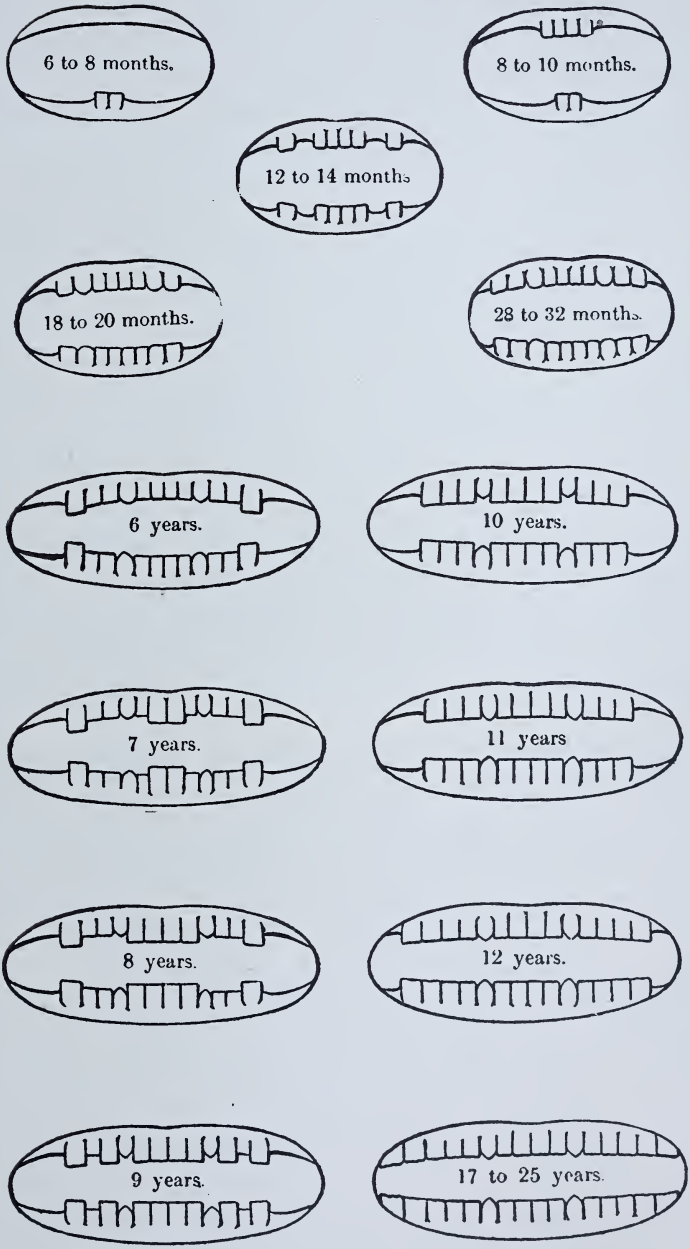
What to Observe in a Child.—The most important points to be attended to in making up an opinion of a child's condition are the countenance, noting its expression, coloration, wrinkles, etc.; the sleep; the cry; the state of emaciation or fatness; the condition of the skin, as to eruptions, color, temperature, degrees of dryness, swelling, etc.; the pulse; the respiration; the signs furnished by the mouth and throat; the power of sucking; and, finally, the state of the abdomen.

Keeping the Baby's Mouth Clean.—The development of a child's teeth is very considerably affected by the care which the mother takes in keeping the baby's mouth clean and in thoroughly sanitary condition. During early life the baby's mouth should be constantly watched and taken care of many times each day, in order that the gums and mucous membranes may be kept in healthy condition. This is done by washing out the baby's mouth before each nursing so that no infected mucus or other foreign materials may be carried into the stomach and cause indigestion, and also as preventive of poison being carried to the mother's nipples.

A glass-stoppered bottle should be procured and filled with a saturated solution of boracic acid, the bottle with stopper out being first thoroughly boiled to insure sterilization. The solution is made by adding a heaping teaspoonful of boracic acid to a pint of water which has been previously boiled for at least ten minutes, care being taken that such water after boiling is properly covered until put in the stoppered bottle, as if exposed to the air the water would again become contaminated with bacteria and the effect of the boiling entirely lost. The solution is ready for use as soon as dissolved. Shake before using.

As required for use pour a small quantity into a cup or shallow dish —just enough for one using, as that which has been poured out of the bottle must not be used a second time nor poured back into the bottle. A piece of clean absorbent cotton is wound around the index or little finger and dipped into the solution in the cup or dish and the baby's mouth is gently but thoroughly swabbed, taking care to wash the insides of the cheeks, about the gums and the upper and under sides of the tongue. Should there be considerable mucus present it may be wise to use several pieces of cotton to make the mouth clean, but under no circumstances

HOW AND WHEN FIRST TEETH COME.



use the same piece of cotton twice, and take a fresh piece each time you dip into the solution. If sterilized cotton is not obtainable any light, white fabric may be sterilized for the purpose by boiling it for an hour or baking it in an oven with temperature over 212° F. for forty minutes. It is well to cut the cloth into small pieces of requisite size before sterilizing and after sterilizing. Keep them in sterilized jar that must be kept covered. Then before nursing, the mother's nipples should also be washed with the same solution, of course using a fresh piece of cotton. Where the baby is fed from bottle great care must be taken to keep the rubber nipple clean. It should be scalded immediately after using and put into a covered receptacle containing boracic solution until it is again needed.

Effect of Diet on Teeth.—The baby's teeth are greatly affected by the food it eats. Of course nothing must be given that does not thoroughly agree with the child's digestion and oftentimes it takes much experimenting to find the food most suitable for the child, what agrees with one frequently not agreeing with another, but in so far as possible the food should contain sufficient material of a bone-building nature to thoroughly supply that requirement in the child. The free and continuous use of lime water in milk not only aids digestion, but is of great value in building up bone. Emulsion of cod liver oil is frequently given to infants who are cutting teeth, and being a nourishing food it aids dentition by toning up the system while, being rich in phosphates, it hardens and develops the bones.

Malformations.—Heredity usually plays an important part in the shape, size and color of teeth, but their hardness, symmetry and utility may be very considerably benefited by attention to the child's diet during dentition and to early care that no force is brought to bear in an abnormal direction in the forming and growth of the mouth and teeth, such, for instance, as is frequently caused by **thumb-sucking.** The child so naturally puts its thumb or finger in its mouth and seems to derive so much contentment therefrom that the mother is very apt to permit the habit to grow, and the facial expression of the child may thereby become so moulded in a wrong or abnormal direction as to be a serious affliction throughout life, for during the first year of the childs' life the jaws are very plastic and may be readily forced in unnatural directions, not only causing deformity in the jaw, but also in many cases displacement of the teeth and the ill probably remains unnoticed until the hardening process of the bones makes remedy painful and difficult—in some cases impossible. Thus what is commonly called a **parrot mouth**—that is, abnormally

high palate or vault, narrow upper arch, protruding upper teeth and retruding lower ones, may be directly attributable to thumb sucking. As the infant lies in recumbent position that portion of the thumb which is continuous with the palm of the hand rests firmly with constant force upon the partially developed gums and roof of the mouth, pressing the latter upward and narrowing the width, while the back of the thumb resting on the lower lip and chin acts as a fulcrum, bringing the full weight of the arm upon the lower jaw, pressing it downward and backward. This produces not only a deformity in facial expression, but causes false location of the teeth, rendering them incapable of properly performing the work which nature intended of them, thereby preventing that mastication of food which is essential to good digestion. Deformities of course are often due to heredity, as for instance large teeth may be inherited from one parent and small jaws from the other, causing a crowding of the teeth within too small a space. **Lip sucking** is another bad habit which may result in depressing the teeth. By drawing the lower lip into the mouth a pressure is exerted upon the teeth which may force them inward to such an extent as to result in deformity, the space for the back teeth being greatly contracted, causing crowding of the teeth. **Mouth breathing** also produces irregularity of the teeth. The habit is commonly indulged in during sleep. It may be due to some nasal obstruction of the air passages, in which case operation may be necessary. Where there is no nasal obstruction the mouth should be so bandaged as to make breathing through it difficult and thus induce breathing through the nose. Special rubber appliances for this purpose can be secured. Also there may be local causes for irregularity of teeth such as too long retention of the first teeth or their too early extraction, or delayed eruption of permanent teeth or their injudicious abstraction. In all cases where such deformities are found to exist, whatever their cause, it is well to consult with a dentist of undoubted standing and qualifications at as early an age of the child as may be possible, as frequently under careful professional care in early childhood such difficulties may be largely overcome.

Illness of Teething.—During the eruption of the deciduous or temporary teeth the child is apt to suffer from indigestion. The lower cuspids or canines, which may come from the fourteenth to the twentieth month, are very commonly called stomach teeth, and the corresponding upper ones called eye teeth. This is due to an idea, which is traditional, that the cutting of these two lower teeth cause an especial disturbance of the stomach and that the cutting of the upper ones affect the eyes. This

idea is erroneous. The fact is that during this time the whole system is undergoing very important changes, the organs of digestion are adapting themselves to the assimilation of other food than milk, and these constitutional changes during dentition produce susceptibility to nervous and digestive troubles and the mother should be more than ordinarily watchful throughout this whole period, but in the specific cutting of a "stomach tooth" there is no more reason to expect disturbance in the stomach than in the cutting of any other tooth. Delayed or difficult dentition may result in general disturbance of the digestive system or affect the whole constitution and exaggerate any other ailment of the child existing at this time, and special care should be taken that the child should not catch cold at this period, as this may retard dentition and be the cause of serious disturbance. The severity of illness commonly depends upon the number of teeth advancing at the same time, but individuals constitutionally vary, and a single tooth in one case may be the cause of much greater disturbance than the oncoming of a number of teeth in the case of another child.

Hot gums, redness, swelling and pain are ordinary and normal symptoms during teething and should not cause anxiety unless they be accompanied by high fever, vomiting, diarrhœa or other noticeable disturbance of the system. The flow of saliva (drooling) which accompanies teething generally allays abnormal inflammation and keeps the gums sufficiently moist and cool. Relief may often be given by rubbing the affected gum with a gold or silver thimble. The thimble must be boiled for fifteen minutes before using, in order to destroy all germs. But when the gum where the tooth is coming is hard and white, the mouth dry and the baby feverish, fretful and sleepless, the gum should usually be lanced, as otherwise there may be convulsions, followed by serious and sometimes fatal constitutional disturbance.

Lancing is also sometimes necessary when the gums themselves display no untoward symptoms, the only indications being general disturbance of the system due to dentition and which may be alleviated by lancing, and this sometimes even when the teeth have put in a partial appearance as a tooth may be held back by the bands of tissue which draw over the surface of the tooth between the cusps, and these bands must be cut to permit of free egress of the tooth. Where lancing is necessary relief usually immediately follows the operation, which is of most simple nature, but which should be done by physician or dentist. The lancet must pierce the gum until it touches upon the tooth and to relieve the pressure must

completely divide all overlying tissue. The tightly-stretched tissues have little nerve sensation and the pain caused by lancing is therefore very slight and is but momentary. However, lancing is by no means always essential, the teeth as a rule cutting their own way through without assistance.

The eruption or cutting of teeth should occur as soon as the teeth are hard enough for use, and as the hardness is dependent upon the amount of lime salts the teeth contain, as distinct from purely animal matter, dentition will be delayed if the child's diet has been lacking in this necessary element, as there is further apt to be general disturbance of the system in various ways.

Temporary and Permanent Teeth.—Temporary teeth contain more organic matter. Consequently they are softer and more quickly subject to decay than the permanent teeth, and unless great care be exercised they are apt to be destroyed and lost before they have performed those important functions which are necessary of them before the coming of the permanent teeth. Temporary teeth are not only essential to proper mastication of food during a period of rapid growth, but they have an important relation in the development of the jaw and their early extraction may not only seriously affect digestion and so the constitution but may retard jaw development, resulting not only in a prejudice to facial expression, but the crowding of the permanent teeth with resultant ill effects of various kinds. The importance then of retaining the first teeth until the second teeth are ready to take their place cannot be overestimated, and therefore there should be constant watchfulness of them and they should not be permitted to prematurely decay. Under normal conditions and where proper attention has been given to prevent decay, the roots will become absorbed and the crowns drop out without even the assistance of a string. But if decay be permitted in the temporary teeth the nerve fibres will be affected and cause such irritation of the pulp tissue as will result in its premature decay and prevent its natural absorption, which would otherwise occur. The child is not only the subject of severe toothache until gumboil forms, but the space to be occupied by the permanent tooth instead of being free for its advance is filled up with roots of the temporary one, so that there is danger of the permanent tooth being forced to one side or other on its course through the gum, resulting in misplaced teeth and inefficient mastication.

Prevention of Decay.—The most potent factor is cleanliness. Children should be trained in the assiduous use of the toothbrush from the

earliest possible age, and should use it after each meal, and until the child is capable of doing this the mother or attendant should carefully wash the mouth and teeth twice daily, using a clean rag and an antiseptic wash and further should at least once a day use a brush, in order to remove particles that cannot be reached with a cloth. The brush should be small with uneven rows calculated to suit the spaces between the teeth. It should be of medium stiffness. A brush that is too soft does not sufficiently stimulate the gums, while one that is too stiff will cause bleeding and soreness. Do not be content with merely brushing teeth on their outer surface. They must be brushed across and up and down, both inside and out and no material permitted to remain in any space or crevice. Constant watchfulness and regular care will greatly conduce to hard and pearly teeth and will not only save the child from much suffering from decaying teeth, but healthy gums and mucous membranes with sound teeth will ensure that with proper mastication the food taken into the stomach will be in right condition for easy and natural digestion, which is an essential of general good health. With the first indication of decay the child should be taken to the dentist and his teeth given such attention as may be necessary. After the child is two to three years of age he should be taken to the dentist several times a year to make sure there are no cavities, which will sometimes be found in spite of care.

Filling Temporary Teeth.—Many people take the view that it is unnecessary to fill temporary teeth, as they are shortly to be superseded by permanent ones, but there are a number of reasons why all cavities should be filled as they occur: (a) Unnecessary suffering from toothache is prevented; (b) Inability to properly masticate food is avoided; (c) The retention of all the temporary teeth until the permanent ones are ready to take their place is assured and thereby the fullness of arch for the permanent teeth is conserved and developed.

Dental Care of Permanent Teeth.—The retention of all permanent teeth is of extreme importance, but perhaps none so important as that of the first permanent molars which at the age of about six years appear back of all the milk or baby teeth. These are often mistaken for temporary teeth and permitted to decay until beyond ordinary methods of restoration. The early extraction of these permanent molars is almost certain to result in the malposition of other teeth, permitting them to occlude improperly, throwing additional and unintended strain on other teeth, causing improper mastication and frequently resulting in prejudicial change in facial expression. The upper and lower molar teeth

should so meet each other as to interlock like the cogs of a wheel and it is the loss of the first permanent molar which more often disarranges the whole occlusion than any other tooth. In case this tooth has been neglected until it is beyond proper repair, there is an advantage in having it extracted before the commencement of the eleventh year, in order that the second permanent molar which cuts through at from the twelfth to the fourteenth year may have room to grow a little forward from its regular place and together with the third molar occupy the allotted space for the three teeth and so give regularity as to the final complement of teeth.

Where a child is suffering from toothache and for some reason cannot be taken to a dentist, a little carbolized resin placed in the cavity on a little piece of cotton will so harden over the exposed nerve as to sometimes afford relief for several weeks, but a dentist should be consulted at the earliest date possible.

Pulse Rate of Children.—

Young infants	100 to 102.
First year	115.
Second year	118.
Second to sixth year	Sleeping, 76; waking, 92.
Sixth to ninth year	Sleeping, 73; waking, 90.
Ninth to twelfth year	Sleeping, 72; waking, 80.
Twelfth to fifteenth year	Sleeping, 70; waking, 72.

In girls the rate is about five beats higher.

Temperature of Children.—1. The daily range of temperature is greater in the healthy child than that recorded in healthy adults, amounting to 1, 2 or 3 degrees.

2. There is invariably a fall of temperature in the evening, amounting from 1 degree to 3 degrees Fahrenheit.

3. This fall may take place before sleep begins.

4. The greatest fall is usually between 7 and 9 P. M.

5. The minimum temperature is usually observed at or before 2 A. M.

6. Between 2 and 4 A. M. the temperature usually begins to rise, such rise being independent of food being taken.

7. The fluctuations between breakfast and tea time are usually trifling in amount.

8. There seems to be no very definite relationship between the frequency of the pulse and respirations and the amount of the temperature, the former being subject to many disturbing influences.

Respiration in Children.—The average frequency of the breathing in

new-born children and during the first week of life is thirty-nine times per minute. It may rise, however, upon very slight disturbances, to fifty, sixty or eighty. In perfectly healthy infants, during sleep the respiration may fall to twenty-five per minute.

Between 2 months and 2 years the average number of respirations per minute is 35.
Between 2 years and 6 years the average number of respirations per minute is 23.
Between 6 years and 12 years the average number of respirations per minute is 22.
Between 12 years and 15 years the average number of respirations per minute is 20.

Evacuations of a Child.—The healthy motion varies in color from a light orange yellow to a greenish yellow, and in number from two to four times daily.

Smell should never be offensive. Slimy, mucus-like, jelly motions indicate worms. Offensive, acid, pale-green motions indicate a disordered stomach. Dark-green evacuations indicate acid secretions and more serious stomach or bowel disorder.

Fetid, dark-brown stools are present in chronic diarrhœa. Putty-like, pasty passages are due to acidity curdling the milk or to torpid liver.

Amount of Sleep Required Each Day.—

At 4 months	20	hours of sleep is required.
At 6 months	18	hours of sleep is required.
At 1 year	15	hours of sleep is required.
At 2 years	13	hours of sleep is required.
At 4 years	12	hours of sleep is required.
At 7 years	11	hours of sleep is required.
At 9 years	10½	hours of sleep is required.
At 14 years	10	hours of sleep is required.

Infant Exercise.—Exposure of infants to pure air should begin in a very few weeks after birth; an hour or two a day at first, but daily whenever the weather permits. They soon evince a strong desire for the open air. When yet carried by the nurse they point to the door; when crawling they try to approach it; when walking they attempt to escape from the house to the air without. This, however, must not be construed into advice to carry out the child in unfavorable weather or for a long time, with an idea of hardening it. Catarrhal inflammations are easily produced in children.

Out-Door Playing.—When old enough to play and romp, the dress should not be so fine as to require an order of good care. Nothing affords more real enjoyment to children, and at the same time tends more decidedly to give them a sound and active tone of mind and body than a liberal indulgence in exercise and in their innocent sports out of doors.

General Signs of Health.—"Rotundity is the beauty of youth." Dr. Meigs says of a healthful child: "Its tissues are firm and solid; its surface of a cool and pleasant temperature; its coloration of clear and exquisite white, firmly tempered with a faint rosy tint in a warm atmosphere, or slightly marbled with light bluish spots in a colder air. Few marks more certainly indicate a healthful temper of the constitution than the clear and exquisitely tinted pink color of the palmar and plantar surface of the hands and feet of a young child. Nothing indeed can be more beautiful or perfect in shape and contour than the figure of a fine, hearty young child; nothing more pleasing to the eye than its delicate but vivid coloring; and nothing more expressive of the fullness of health than its whole appearance." The movements and gestures of a child give a clue to its condition. Healthy children, when awake, are in almost constant motion, or at constant play.

Diet.—"Food is the primary necessity in raising children; the character, quantity and time of administration should each have the scrupulous attention of all those who are responsible for the welfare of children." Dr. A. Jacobi says: "Children not only eat to live, but eat to grow also." Children need to be fed oftener than adults. The growing boy and girl each require a relatively greater quantity of food than the adult. The best results are to be gotten by a mixed animal and vegetable diet.

The following is a useful summary:

GENERAL RULES FOR FEEDING YOUNG CHILDREN.

1. Allow time for meals.
2. See that the food is thoroughly masticated.
3. Do not allow nibbling between meals.
4. Do not tempt the child with the sight of rich and indigestible food.
5. Do not force the child to eat against its will, but examine the mouth, which may be sore from erupting teeth; and examine the food, which may not be properly cooked or flavored. If good food is refused from peevishness merely, remove it and do not offer it again before the next meal time.
6. In acute illness reduce and dilute the food at once.
7. In very hot weather give about one-fourth or one-third less food and offer more water.

DIET FOR YOUNG CHILDREN.

TWELFTH TO EIGHTEENTH MONTH.

7 A. M.—Stale bread soaked in a breakfastcup of new milk.

10 A. M.—Milk, six ounces, and soda biscuit, or a thin slice of buttered bread.

2 P. M.—Beef tea, six ounces, bread and a tablespoonful of rice and milk pudding.

6 P. M.—Same as first meal.

10 P. M.—Same as first meal.

In alternation a lightly boiled egg, with bread crumbs and six ounces of milk may be given at 7 A. M., and at 2 P. M. a mashed baked potato moistened with four tablespoonfuls of beef tea; two tablespoonfuls of junket.

EIGHTEENTH TO THIRTIETH MONTH.

7 A. M.—New milk, eight ounces; the yolk of an egg lightly boiled; two thin slices of bread and butter, or else milk, and two tablespoonfuls of well-cooked oatmeal or wheaten grits, with sugar and cream.

11 A. M.—Milk, six ounces, with a soda biscuit or bread and butter.

2 P. M.—One tablespoonful of rare mutton pounded to a paste, bread and butter, or mashed potatoes moistened with good dish gravy, a saucer of junket; or else a breakfastcupful of beef tea or mutton or chicken broth, a thin slice of stale bread, a saucer of rice and milk pudding.

6.30 P. M.—A breakfastcupful of milk, with bread and butter, or soft milk toast.

TWO AND A HALF TO THREE AND A HALF YEARS—i. e., for Children Who Have Cut Their Milk Teeth.

7 A. M.—One or two tumblers of milk, a saucer of thoroughly cooked oatmeal or wheaten grits, a slice of bread and butter.

11 A. M.—If hungry, a tumbler of milk or a teacupful of beef tea, with a biscuit.

2 P. M.—A slice of underdone roast beef or mutton, or a bit of roast chicken or turkey, minced as fine as possible; a mashed baked potato moistened with dish gravy, a slice of bread and butter, a saucer of junket or rice and milk pudding.

7 P. M.—A tumblerful of milk and a slice or two of soft milk toast.

FROM THREE AND A HALF YEARS UP.

Breakfast.—Every day: Milk, porridge and cream, bread and butter. One dish only each day: Fresh fish, eggs lightly boiled, eggs poached, eggs scrambled, eggs (plain omelet), chicken hash, stewed kidney, stewed liver.

Sound fruits may be allowed before and after the meal, according to taste, as oranges without pulp, grapes (seeds not to be swallowed), peaches, thoroughly ripe pears and cantaloupes.

Dinner.—Every day: Clear soup, meat roasted or boiled and cut into small pieces, bread and butter. Two dishes each day: Potatoes baked, potatoes mashed, spinach, stewed celery, cauliflower, hominy, macaroni (plain), peas, string beans (young), green corn (grated).

Junket, rice and milk or other light puddings and occasionally ice cream may be allowed for dessert.

Supper.—Every day: Milk, milk toast or bread and butter, stewed fruit.

From the third to the fifth year the child has twenty teeth, and often three meals a day suffice, although from the third to the fourth year four may be given.

When the second set of teeth begin to replace the deciduous or milk teeth, which gradually decay, digestion is sometimes interfered with temporarily from lack of ability to masticate thoroughly, and the food should be thoroughly subdivided before it is offered to the child.

Cereal Food.—Bread, rice, oatmeal and other cereal foods should always enter largely into the dietary of healthy children after they are able to digest them. Their fats should be derived chiefly from butter and cream. The best fruits for them are oranges, cooked apples and stewed prunes.

Diet Between Three and Four Years.—Children between three and four years of age should be fed when in health four times a day—at 7 A. M., 10.30 A. M., 1.30 P. M. and 6 P. M.

First Meal.—Half an orange, one and a half teaspoonfuls of oatmeal or hominy, well salted, with two tablespoonfuls of cream, but no sugar, and one glass of milk.

Second Meal.—A glass of milk or cup of broth and one slice of stale bread.

Third Meal.—Meat—either steak, chop or chicken—one green vegetable (e. g., spinach), one starchy vegetable (e. g., potato), water to drink, stewed prunes for dessert.

Fourth Meal.—Bread and milk or milk toast.

FOODS FORBIDDEN TO ALL YOUNG CHILDREN.

Indigestible Foods.—The following articles are particularly indigestible for children, and should not be allowed them under four years of age, and most of them should not be given under seven or eight years: Fried food of all kinds, game, salt food, the flesh of swine in all forms, pickles, salads, condiments, except salt, "stews," the "dressing" of fowl, sauces, visceral foods (such as liver, kidneys, tripe, etc.), all raw vegetables, potatoes (except baked), tomatoes in any form; the coarser vegetables, such as beets, turnips, cabbage, and so forth; fancy bread, cake and pastry; griddle cakes, canned food of all kinds; fancy confectionery, sweets and preserves; cheese, rich soups, jellies, dried or unripe and overripe fruits (bananas, so often given to young children, are very bad for them), nuts, fruits with large seeds, such as grapes, the skin of all poultry, fruits or vegetables.

Good Cooking.—All food should be plainly and thoroughly cooked. No greasy or highly seasoned dishes are permissible, and, as a rule, twice cooked meats are indigestible.

Forbidden Drinks.—Tea, coffee and alcohol in every form must be withheld. The two former beverages interfere with digestion and make the child nervous, and the latter lays the foundation for a permanent alcoholic habit. Soda water with syrups should not be given. Too much water should not be allowed with meals, and what is given should not be ice-cold.

Regular Meals.—Children, as they grow up, should continue to observe regularity in the hours for taking meals, and the habits of perpetually nibbling at cake, crackers and confectionery between meals should not be tolerated. It is best for young children not to be put to sleep immediately after their most substantial meal of the day. As they require a nap in the early afternoon, many advise giving this meal at 4 P. M.

INDIGESTION IN INFANTS AND YOUNG CHILDREN.

The stomachs of infants and very young children being in process of development are capable of digesting and properly assimilating but comparatively few articles of food, and these only when taken in small quantities at a time. Either overfeeding or the feeding of improper articles will cause derangement that may have serious consequences.

Indigestion with infants and children, as with older people, may be *acute,* lasting only a few days, or perhaps but a few hours, or it may be *chronic,* lasting perhaps for months or even years. Bottle-fed children are more apt to suffer from indigestion than are those who are nursed at the mother's breast, if the mother be healthy and her milk of good quality and sufficient in quantity. When indigestion occurs with nursing infants it will usually be found to be due to the milk of the mother or wet-nurse which may be but temporarily affected by some local condition, such as strong mental emotions of grief, fright or anger, or by some passing physical disturbance such as indigestion, or by indulgence in some article of diet not suitable for one who is supplying an infant with food from her breast. Sometimes a diet which one mother may find advantageous in providing wholesome milk for the child may be unsatisfactory with another. Where a wet-nurse is employed it may be that her own child was born too long before the birth of the child she is engaged to nurse, and so her milk not suitable for the younger child, as the composition of breast-milk changes gradually as time goes on. Reappearance of the menses while nursing generally has an unfavorable effect upon the milk which may assume such character that the child cannot assimilate it and weaning may become necessary. Indigestion, too, sometimes attends weaning, due to the new food being given too suddenly or in a strength beyond the child's power to digest.

Delicate or feeble children; sufferers from scrofula, rickets, etc.; those recovering from acute diseases and complaints, and children who are teething all have delicate stomachs which are readily upset by very slight changes in quality or even the smallest increase in quantity, and they suffer from indigestion. Another fruitful cause of indigestion is the sudden change from a liquid to a solid diet. In older children overloading the stomach or eating food that is hard to digest are common causes of indigestion.

Symptoms of Acute Indigestion in Infants and Children.—Both with nursing infants and with children who have passed first dentition there are marked signs of distress. They are cross, fretful and peevish and sometimes suffer great pain, sometimes simply moaning and in other cases breaking into fits of screaming. Usually the face is very pale and they have the appearance of severe illness. The food remains for a long time in the stomach in an undigested form, which causes nausea, retching and finally vomiting. The length of time between the meal and vomiting and the degree of digestion the food has reached in the stomach during

that time are indicative of the state of the stomach and severity of the attack. If vomiting comes at an early stage there is great and almost immediate relief. If vomiting is delayed there is fever, high pulse and prostration, the tongue is usually coated, the belly becomes swollen and hard, there are muscular twitchings and startings and these symptoms are sometimes followed by convulsions, especially in infants and very young children who are highly nervous.

Attacks of acute indigestion usually come on suddenly and frequently can be traced to some specific violation of diet, and if vomiting follows quickly and is full and free there is almost immediate recovery and an hour or two after the child may be as well as ever or at worst is but slightly indisposed for a day or two. But, if vomiting or other relief be long delayed there is danger of serious trouble, especially in the case of infants and very young and delicate children.

Treatment.—The undigested food, which is the cause of the irritation, must at once be removed. With babies whether nursing at the breast or feeding from the bottle a quantity of lukewarm water may be given by spoon or from bottle, and this should act as an emetic. At the same time an enema of soap and water may be administered to relieve any undigested food which may have passed into the bowels. After the stomach has been emptied no food should be given for four hours, and after that the greatest care exercised for the next twenty-four hours. If the child is at the breast and the trouble known to be due to some error of diet of the mother or wet-nurse, it may be well to keep the child from the breast until the disturbing cause has been removed with the mother or nurse, simply feeding it on barley water administered in small doses in the meantime—care of course being taken to relieve the breast of milk during this time by artificial means so as to prevent caking or other trouble. In some cases weaning or change of nurse may be necessary.

As an emetic for children who are a little older, there is nothing better than ipecac administered in doses to suit the age, and this may sometimes be found advisable even with nursing children. For a child two or three years old a teaspoonful of the syrup of ipecac may be given or ten grains of the powder, and the dose repeated in twenty minutes if the first dose is not effective. This dose must of course be reduced for younger children to suit their particular age. If vomiting has not afforded relief and the child draws up its legs and cries with pain, and the bowels appear hard and distended, a dose of castor oil should be given, and if the symptoms are very severe the action of the oil may be assisted

by giving an enema of warm soapsuds. If there are indications of convulsions, especially if the child has suffered from them before, it should at once be placed in a warm bath. (See particulars as to treatment of convulsions under Accidents and Emergencies.) Application of hot flannels or poultices over the abdomen are often of much value in affording relief.

In severe cases of indigestion too great care cannot be exercised as to feeding for several days. There is real danger in commencing the use of hearty food too soon or of giving it in too large a quantity. Even a nursing child must be brought back to the breast with care. It may be advisable to keep the child from the breast for a whole day, and then only permit it to remain at the breast two or three minutes every three hours, gradually increasing the time at each nursing in accordance with the improvement seen. During this time nourishment of the child may be sustained by small doses of barley water or by small quantities of properly modified cow's milk and lime water, care being taken not to overfeed and the cow's milk being discontinued if it does not thoroughly agree with the child.

Chronic Indigestion.— While not causing the immediate distress of acute indigestion, chronic indigestion in children is more difficult of treatment, as the cause of the trouble cannot be so readily told, and the cause must be known and removed before real betterment of condition can be hoped for. With infants who are nursing at the breast, strict regard must be had to the quality of the mother's milk, and if there is reason to judge that this is the cause, as is most frequently the case, the child must be changed to bottle feeding, in respect of which the utmost care must be taken that the ingredients of the nourishment thus administered are not only suitable to the child's age, but to its existing condition of stomach. Read carefully instructions as to Infant Feeding in an earlier part of this chapter. In bottle-fed children these same instructions on Infant Feeding should be carefully studied. In the case of older children particular care should be taken that their food is truly wholesome and especial endeavor should be made that they have their meals at regular hours. Eating between meals is often a source of serious digestive trouble. Yet the child should not be forced to go hungry because of some hard-and-fast rule. In children of from one to two years a bread and milk diet should be largely relied upon, though an occasional exception may be made. As a rule at this age vegetables are not wholesome, and potatoes, to which children usually show much partiality, are frequently a potent source of

stomach trouble. If potatoes are desired, they are much better baked than boiled, but even then should be given sparingly where the stomach shows indication of weakness. Where the child is given meat (which should not be until it has at least its molar teeth) rare (underdone) beef is probably best, whether as roast or steak, but chicken is also wholesome and sometimes lamb and even veal, if especially well done, will be found to meet all requirements of easy digestion. Fat meats of all kinds should be avoided and pork in any form is to be shunned. Ripe fruits may be used in season, but in moderation, and they should not be "over-ripe."

Fresh air is of almost equal importance with proper diet. It is not unusual for a child quite free from indigestion during summer months, when it is almost constantly out of doors, to suffer continually from indigestion during winter months, when it is kept almost completely within door. Fresh air and outdoor exercise are as needful to the child in winter as in summer.

Existing constitutional troubles, such as rickets, scrofula, etc., or perhaps debility arising from some previous disease, such as measles, scarlet fever or other ailment, may cause chronic indigestion. Read the articles on these different constitutional diseases. In such cases an emulsion of cod liver oil (if the stomach will stand it) will often prove useful, and some of the numerous preparations of iron, or some of the bitter tonics may prove helpful. But do not constantly dose your child with medicine. There is always a danger of over-drugging children who have chronic indigestion, and this of itself oftentimes keeps up a trouble of the stomach which fresh air, moderate outdoor exercise and careful dieting would cure without medicine or very little of it.

Among medicines that may be used in moderation and in doses to suit the age and constitution of the child, the following may be mentioned: Emulsion of cod liver oil, using an emulsion made with the lacto-phosphates rather than the pure oil; powdered carbonate of iron, administered in grain doses; nux vomica as a bitters, one or two drops in half a wineglass of water being given to a child of three years. Iron and nux vomica may be administered in the same preparation. The following prescription is frequently efficacious:

R.—Tr. Nucis Vomica ..... ½ drachm
Elix. Calisaya ..... 6 drachms
Tr. Card. Co. ..... 2 drachms
Ess: Pepsin ..... 2 ounces
Dose: Fifteen to thirty drops in water three times a day.

CATARRH OF THE MOUTH OR CATARRHAL STOMATITIS.

This is an affection of the mouth due to stomach trouble. The mucous membranes of the mouth and tongue are not only red and swollen, but are covered with a thick slimy mucus, and there is considerable local pain. The disease is common in infants and children, with whom it may be due to teething or to certain fevers, such as measles, scarlet fever, etc. The mucous membrane of the mouth becomes red and hot, causing a smarting or stinging pain, and there is an excessive secretion of saliva. The breath is foul and there is an unpleasant bitter taste in the mouth, accompanied by disturbance of the stomach and feverishness. The trouble usually subsides with treatment in a week, though sometimes endures longer. It is chiefly confined to infants and children, but occasionally is found in adults, chronic cases sometimes appearing in adults as the result of excessive use of tobacco or alcohol.

Treatment.—Mix well together two tablespoonfuls of honey and half a drachm of powdered borax and give a teaspoonful twice a day, administering it slowly and in such manner as to anoint all sore spots that may be visible. An excellent mouth wash is the mixing together of 40 grains of chlorate of potash, 15 drops of myrrh and 2 ounces of elixir of calisaya. A teaspoonful of this should be put in a wineglass of water and the mouth washed every four hours. If it is found too strong it may be further diluted. Another preparation which may be found beneficial is the following: Bismuth subnitrate, ½ drachm; magnesia powdered, 2 drachms; bicarbonate soda, 12 grains; sugar milk, 24 grains. Make twelve powders; one two hours after feeding.

MALFORMATION OF MOUTH.

Hare-lip.—Children are sometimes born with a curious malformation of the upper lip, which has failed to unite at the centre previous to birth, and the child is left with a deep cleft sometimes reaching from the lip to the nostril. This cleft is usually at one side or other rather than in the center and sometimes is double—that is, there is a cleft on each side—or it may be complicated—that is, combined with a fissure of the palate (roof or upper part of mouth). It can only be remedied by surgical operation. The deformity may be so great as to prevent the child from nursing through inability to grasp the nipple or so inefficiently as to prevent securing sufficient food for nutrition. In such cases an im-

mediate operation is necessary. If the deformity does not interfere with nursing it is generally better to postpone operation until at least the fifth month, and may in some cases be advantageously delayed even as late as the eighteenth month. The operation is very simple, but should be performed by a skilful surgeon as in order to leave the least unsightly scar an exceptional nicety of adjustment of the parts is necessary.

Cleft Palate.—This is similar in nature to hare-lip, of which it is often an accompaniment. It is apt to seriously interfere with speech and should be operated upon by surgeon, the operation, as in the case of hare-lip, being delayed for some months unless the cleft is of such nature as to interfere with proper nursing.

Tongue-tie.—This malformation is caused by the undue shortness of the small membrane, called the frenum, which is attached to the tongue on the underside and which is thus sometimes to its very tip tied to the lower jaw. It can be detected when the child opens its mouth in crying and by its inability to thrust out the tongue. If it interferes with nursing it should be operated on the next day by nicking the band at the front edge and then tearing it back to about the usual position. No cutting should be resorted to, excepting in this superficial way, on account of a very active little artery which lies at the root of the tongue, and which, if wounded, might bleed so as to endanger an infant's life before the hemorrhage is stopped. On this account, if nursing is not seriously interfered with, it is better to wait some months before this untying. Simple as the operation is it is always advisable to have it performed by a surgeon if one can possibly be obtained. If the tongue can be thrust beyond the red edge of the underlip no operation is likely to be necessary.

COLIC.

Colic is one of the most common troubles with young children, especially during the first five or six months of infancy, and is invariably due to disturbed digestion. Both nursed and bottle-fed babies are subject to it, and it may occur in the healthiest baby from error in the last meal, and may be due in the case of a nursing baby to some indiscretion in diet on the part of the mother, or with a bottle-fed baby it may be due to a carelessly prepared bottle. See remarks on indigestion of children.

Slight attacks are frequent with almost all infants, the baby suddenly becomes fretful, draws up its legs toward the abdomen, cries for a few minutes and then becomes quiet. In a short time another attack occurs

and in turn subsides, and thus it goes on until relief is secured. It frequently happens, however, that the attack is much more severe and the symptoms become violent: there is continued unappeasable screaming, spasmodic kicking, reddening of the face, writhing of the body, etc., and the abdomen usually is not only disturbed, but hard and tense.

Treatment.—In the first place the feet and hands should be warmed by placing them against a hot water bottle or holding them before an open fire; the baby should be turned on the stomach, lying on a hot water bottle or hot flannel; pat the back gently to help up the wind, and as a relief to pain and also as an aid to belching give a teaspoonful of hot water with or without the addition of a few drops of essence of peppermint, anise, gin, brandy or asafœtida. Hot catnip tea is a safe and often efficient remedy and a soda-mint tablet dissolved in a wineglass of hot water is often helpful in relieving pain. Frequently relief is obtained by a rectal injection of one or two teaspoonfuls of glycerine in from two to four ounces of cold water—or ten drops of turpentine in a half teacupful of warm water injected slowly into the rectum, the abdomen being at the same time gently rubbed, will be found an excellent remedy. When with a nursing child colic is frequent and severe, there is usually reason to believe that the mother's milk is unwholesome, and it will probably be necessary to put the child on a diet of modified cow's milk.

The following prescription often proves of much avail in cases of violent colic: Bismuth subnitrate, 1 drachm; tincture cardamon comp., 1 drachm; glycerine, 2 drachms; essence of pepsin, 4 drachms; peppermint water to make 2 ounces. Fifteen to thirty drops, to be repeated.

Mothers and nurses cannot be too strongly cautioned against relieving colic by the common and pernicious habit of administering frequent doses of anodynes and carminatives. Almost all mixtures of this kind contain more or less opium and countless infants have been permanently injured by their employment, and beyond question death in many instances has been directly attributable to their habitual use. Among characteristic symptoms of continuous use of such drugs with infants are: loss of appetite and impaired digestive powers and constipated bowels, the skin then loses its healthy tinge, general apathy and debility follow, and if long continued there is apt to be termination in convulsions, dropsy of the head, glandular swellings, incurable jaundice or fatal exhaustion of the vital energies. These drugs are often administered to an infant by some nurse girl or woman in attendance without a mother's knowledge, and mothers should always be on guard against such happenings.

CRAMP IN THE STOMACH OR GASTRALGIA.

Children are frequently troubled with cramps in the stomach or a form of neuralgia, which causes violent pains in the stomach. They may be the effect of cold, through exposure, wet feet, drinking ice water and like causes, or they may be forerunners of acute stomach indigestion, due to indiscretions in eating.

The symptoms may be confined to mild intermittent pains in the stomach, or there may be such severe pain as to cause prostration, cold perspiration, faintness and a general pallor of the face.

Treatment.—The child should be put to bed and hot water bottles applied to the stomach and feet. Make a paste of mustard and olive oil (the olive oil prevents blistering) and spread this fairly thickly between two pieces of very thin flannel, which lay on the child's stomach. Administer hot drinks such as strong ginger tea. Hot water with a little brandy or gin may be given and where there is much pain five drops of spirits of chloroform may be added. Usually ginger tea if made sufficiently strong is better than any liquor. No food should be given while there is any pain, and when this is entirely relieved only the simplest and most easily digested food should be given.

INFANT DIARRHŒA.

At no other period of life is diarrhœa so common as in infancy, and not only so but the attack at this stage of life is more likely to become unmanageable and assume dangerous character than in later childhood or adult life.

The trouble may be due to any of various causes. Malnutritious food is the most potent cause. Nursing babies are less subject than bottle-fed infants. Infants fed with solid foods are especially liable to attacks, and where regularly allowed to partake of potatoes, meat, vegetables, etc., are liable to become afflicted with chronic diarrhœa. Intense summer heat is conducive to this trouble and complaints are much more frequent with children during summer weather than at any other season of the year.

Treatment.—A purgative dose of castor oil, laxol or syrup of rhubarb may be given, or a powder containing one-tenth of a grain of calomel and one grain of bicarbonate of soda, giving one such powder each half

hour until eight or ten have been taken, when follow with a teaspoonful of rice water or albumen water may be given, or whey. After this be very careful in feeding and if necessary change food.

If there has been continued diarrhœa for some time, the cleansing of the bowels by castor oil or other purgative will probably be unnecessary, and in such cases one-half to one grain of Dover's powder mixed with three grains of subnitrate of bismuth may be given, one such powder being administered every three or four hours. Another prescription recommended is the following:

Bismuth subnit. ..... 24 grains
Comp. chalk powder ..... 16 grains
Make into twelve powders. One every two, three or four hours.

Where there is much prostration five or ten drops of brandy in a teaspoonful of water may be administered from time to time as judgment dictates.

A teaspoonful, or one drachm, of castor oil is a purgative dose for a child up to six months, and is best administered in hot milk. For children up to six months, however, an enema of hot water (one pint) is frequently better than a purging dose.

Where there is fever the child should be sponged from time to time with a mixture of hot water and alcohol—about equal proportions.

CHOLERA INFANTUM (Summer Complaint).

Symptoms.—The first symptoms are heat and pain in the region of the stomach and bowels, hands and feet, followed by vomiting and purging, or both, with griping and severe pains at the pit of the stomach. Evacuations become greenish-yellow and slimy, frequent and painful. Vomit is also greenish and more or less offensive and sour. There is great prostration, with loss of bodily heat and intense thirst; later, a cold perspiration appears, and unless relief is afforded the patient speedily succumbs, or the disease passes into a chronic state.

Causes.—Causes are: unwholesome food, hot weather, bad ventilation, or painful teething.

Treatment.—1. The first step is to remove the cause—a nursing babe may suffer from an improper diet on the part of the mother. Give the patient pure air and sunlight—a trip to the country or on the water

may be all sufficient. If the trouble comes from teething, have the gums lanced and cared for.

2. The treatment should generally be very simple. When the symptoms first appear apply a spice plaster, or light mustard plaster, or flannels wrung out of hot water and spirits, over the whole abdomen; give a few teaspoonfuls of mint tea, and keep the child as quiet as possible.

3. The following mixture has been used with great success, in early stages especially:

Prepared chalk	10	grains
Subnitrate of bismuth	10	grains
Paregoric	1½	teaspoonfuls
Syrup of ginger	5	teaspoonfuls
Gum arabic mucilage	5	teaspoonfuls

Mix. Dose for child one year old, one-half teaspoonful two to six times a day, usually not oftener than once in five or six hours. Vomiting may be relieved by giving small pieces of ice, if the child is old enough to swallow them. This treatment will often bring relief, but if it does not, give a teaspoonful of flaxseed tea or slippery elm tea, with (for a child four to six weeks old) one drop of laudanum, once in two or three hours.

4. If child is two or three months old, give two drops of laudanum; if six months old, give three drops; if a year or more give from four to eight drops, according to age. If the stomach will not retain this remedy apply it as an injection, using a tablespoonful of thin boiled starch, blood heat, to double the amount of laudanum prescribed above—that is, two drops for a child of thirty days, four drops for a child of two or three months, and so forth.

5. As a general rule, we may say, give as little medicine as possible, and if the simple remedies first named do not give prompt relief, as they very often will, with proper care, call a physician in preference to trying to handle the case in its severe forms.

NURSING THE BABY.

Throughout this chapter we have recommended that in all cases where possible the mother should nurse her child, and there is no more fitting point with which to close.

It is stated on high authority that seven bottle-fed babies die to one that is breast-fed. It follows that it is the mother's duty to nurse her child if she can; that is, if she has sufficient wholesome milk. The baby should be breast-fed until it is at least six months old, and should never be

weaned in hot weather. Mother's milk is made up of 87 parts of water and 13 parts of solids, these latter being fats, sugar, proteids, and salts. They are all essential to the nourishment of the child, the fats to build up fatty tissues of the body and produce body heat and energy; the sugar gives similar results; the proteids build up the cells which compose the blood; the water holds the food in such solution that it may be digested and assimilated and aids the work of all the excretory organs; the salts are needed chiefly for the blood. It is of course possible to modify cow's milk so that it closely resembles the mother's milk in the proportions of its composition, but there are qualities in the mother's milk which cannot be reproduced by imitation. Moreover, no one knows the exact state in which the mother's milk goes from her breast to the stomach of her babe, but we do know that it is perfectly adapted to the requirements of the child.

Mother's milk not only gives the baby necessary help in the complicated task of growing, but to a large degree it renders the child immune to illnesses of many sorts and greatly increases the chance of life. Again it is easier to nurse a baby at the breast than to feed it by bottle. To secure pure milk, to properly modify it, to keep bottles and nipples and all utensils absolutely clean and sterilize them, is all matter requiring most scrupulous care and much work, and when the baby does not thrive and some change in its food is necessary, the difficulties of artificial feeding are multiplied. Too often it happens that the baby's first year is spent in a series of unfortunate feeding experiments, with the result that the growth and general development are seriously retarded. Then, too, a bottle-fed baby is often left to the care of nurse-maids who are careless and negligent as to the cleanliness of bottles and nipples and of the manner of feeding, and illness of the child follows.

There are of course cases where the mother cannot nurse her child, no matter how much she would wish to do so. But as a matter of fact the cases are very rare when maternal nursing is really impossible. It is the duty of every doctor and every nurse to insist that the mother shall exercise this function—to do everything possible to establish lactation, to promote it and even to bring it back if for any reason the breasts have ceased to secrete.

The milk does not come to the mother's breast until from 48 to 60 hours after the birth of the child, but during the interim period the baby needs no food. It may be given a few drops of slightly warmed water now and then, and beginning some six hours after birth it should be put to the

breast every six hours until the milk arrives. The first secretion of the breasts is called Colostrum, and serves some useful purpose to the baby, but perhaps the greatest value of this early nursing is the training of mother and babe in the habit of nursing. For the first few days and until the relation between supply and demand is established, there may be an excessive flow of milk to the breasts. If there is overdistension of the breasts the excess milk may be removed by the use of the breast pump, but this should not be resorted to unless absolutely necessary, or relief may be obtained by gentle massage of the breast, using warm oil on the hands. However, all manipulation tends to stimulate the glands to greater activity, and it is therefore usually better to relieve the discomfort in other ways. A bandage properly made and properly applied is oftentimes most availing, but this requires professional skill for its successful use. Hot or cold applications (according to the weather and the patient's preference) are sometimes of avail. Great care must be exercised to adopt nothing but the gentlest methods. Usually nature will soon take care of the excess of milk.

The nipples must be kept in good condition. They should be washed with boric acid or clean water after each nursing, thoroughly dried and at all times kept perfectly clean. They are apt to crack as a result of the baby's efforts to nurse and should this happen a nipple shield should be used (rubber or glass) until the abrasions are healed, for if the baby's mouth comes in contact with the sore nipple, infection may follow, which may lead to breast abscess, a most painful affliction and one which calls for surgical treatment. Cracked nipples may also result from permitting the baby to nurse too long at a time or at irregular intervals. Regularity in the times of nursing is of vital importance, both as respects the mother and the child.

The question of whether the baby is getting enough food may be determined by weighing at the end of each week or oftener. There is apt to be a slight loss in weight the first week, but after that there should be a steady gain in weight. If the baby cries much or does not gain in weight, it may be that the mother's milk is deficient in some necessary qualities, and it will be well to consult the family physician. The mother should not decide to give up nursing the baby excepting under most exceptional circumstances, and then only after consultation and advice. Even a very small quantity of mother's milk is valuable to the child, and especially during the first three months every effort should be made to give the child at least some quantity of maternal milk, even though the

bottle has to be resorted to as well. The attempt to nurse the baby will stimulate the flow of milk and with proper diet and general health will often establish this function, even when apparently hopeless. In the meantime the baby's food must be supplemented by cow's milk properly modified.

Diet for the Nursing Mother.—Usually this should be practically the same as during pregnancy, and the mother may largely follow her own inclinations as to what she eats. It is doubtful if the old idea that acids and vegetables taken by the mother cause colic with the child, nevertheless if they, or any food or drink, disturb the mother's digestion it is apt to have an unfavorable effect upon the milk, and should be discontinued, and it is therefore necessary to watch the diet very carefully and eliminate all articles that do not thoroughly agree. Eat slowly, chew all food thoroughly and above all refrain from worry, and the chances all are that the milk will agree with the baby. Constipation should be guarded against just as carefully as during pregnancy.

If there be but scanty quantity of milk it is an indication that there should be a more generous diet. Plenty of fresh milk, eggs, fresh vegetables, ripe fruit, and other plain simple food are required. In event of capricious appetite it will be better to take five or six small meals daily instead of three large ones. It cannot be too strongly commended that the mother while nursing should be in a quiet state of mind. There is nothing that interferes with a good secretion of milk than an overwrought or nervous condition, and notwithstanding the troubles and sorrows may be such as to make it almost imposible to keep from worrying, the remembrance of the little life that is so dependent on the mother's milk being wholesome may help to bring about a quieter state of mind. The mother should have pleasant outdoor recreation, and be surrounded with cheerful society, and as far as possible a variety of things that will interest her, and there should be every endeavor made to have at least eight hours sleep at night besides ample resting throughout the day. Air and sunshine are essential.

When the nurse has gone and the mother is left to herself she is apt to grow weary with the care of the child which now devolves entirely upon herself while she is yet more or less weak from her confinement, and at this time there is apt to be a diminishment in the quantity of milk secreted, causing the mother to become discouraged and inclined to believe that she will have to give up nursing her child. This is almost invariably a mistake. The strain of this period is gradually relieved from day to

day as the mother and babe become gradually adjusted to each other's ways, health revives and slowly but certainly things grow more comfortable, and with this improving state the milk will come back in its needful quantity. In a word, if the mother will specially strive to carry herself and the baby past this period she will in all probability be able to afterward successfully nurse her child. Every possible effort should be made to this end before resorting to weaning. The return of the menstrual periods is not necessarily sufficient reason for weaning, though it sometimes so affects the milk as to make it advisable, but pregnancy demands weaning because the mother's strength is not sufficient for the double tax.

A MOTHER'S RESPONSIBILITY IN CHILD TRAINING

"Mothers," remarked the cynic, "are of two classes: those who have preconceived ideas as to how to bring up their children and won't learn, and those who have no ideas and can't learn."

Ignorance of Mothers.—We will probably not all agree to this rather sweeping statement, for most of us are fortunate enough to number among our acquaintances several brave, conscientious women who are true mothers in every sense of the word. But looking the facts squarely in the face, we must admit that there are lamentably few such examples, and that the majority of women are most woefully ignorant on the important subject of child-training.

Occupation of Motherhood.—In these days of skilled labor, a person who desires to teach a certain branch of knowledge will spend several years beforehand in preparation. Women as well as men have learned to their cost that in order to obtain a business position they must be able to perform its duties well. The sole exception to this rule seems to be in the case of motherhood, which, of all the occupations in which a woman can engage, is beyond doubt the highest and the most difficult. Possibly because there is no money consideration attached to her duties, a mother's labor in the bringing up of her children is not generally considered in the light of a profession, and hence a woman rarely hesitates to undertake this difficult task without a previous study of the subject. The disastrous result of this act is felt not only by the child but also by the thoughtless mother, who alone is responsible for the consequences.

Who Are to Blame.—Ungrateful and wayward children have always been looked upon with horror, and unbounded sympathy expressed for the parents in their terrible affliction. All that is very right and proper, provided it is the children and not the parents who are to blame. Unfortu-

nately the latter is too often the case, and the sympathy that is given the father and mother frequently belongs to the unhappy offspring, who are made the innocent victims of someone else's ignorance or wrongdoing.

Children's Rights.—Too few mothers recognize the fact that their children have certain rights which should be respected; that among these rights are a healthy body, a good disposition and an intellectual and moral training. To the extent of her powers a mother should provide these for her child. I emphasize these duties as appertaining to the mother, since it is she and she alone in whom is vested the important office of the education of her offspring. The father provides the funds and may aid and advise his wife, but he can never take her place in the lives of his children.

Children's Imitative Powers.—The most characteristic thing about children is their power of imitation, and this power can be made to serve both a desirable and an undesirable end. Few people realize the extent to which this practice is carried by the average child and the reason for its existence. The child is a stranger in an unfamiliar world and among people of whose customs he knows nothing. There is an undefined prompting which urges him to imitate the acts committed by those around him, and even the words they speak. Finally, by constant repetition, he begins to understand what to him at first was an enigma. In the case of the tiny baby this imitation is unconscious, but finally it is performed consciously.

Children's Surroundings.—The tremendous importance of a child's surroundings will at once be seen. Since he must imitate, it is right that he should see and hear only things worthy of imitation, and herein lies a great difficulty; for people cannot be made to comprehend that what they do and say in the presence of children can have any effect upon their characters. "The child is too young to take it in," they assert. Some day they are startled and embarrassed when the youngster repeats their action and the very words uttered by them, in the presence of strangers. The truth is that children comprehend more than we know, and the ideas which they receive may lie dormant for some time before they are able to give them out. This explains many seemingly incredible acts of memory on the part of very young children.

Dispositions and Temperaments.—Not only do children imitate the words and actions of those around them, but they also reflect in a wonderful degree their dispositions and temperaments. If one or both of the parents are nervous and irritable, the chances are that their offspring

will be the same, and, on the contrary, if the family life is peaceful and happy it will be reflected in the sunny dispositions of the children. All these things will be considered by the wise mother who does not wish the little one to enter the great struggle of life with a terrible handicap at the very outset.

Froebel's System.—Friedrich Froebel, the originator of the kindergarten, and the greatest student of child nature that the world has ever known, was the first to see that the education of the child must begin when he is born. It is necessary, therefore, for the mother to understand the nature of the little being whose destiny lies in her hands, and to this end Froebel formed classes especially for mothers where they could be taught the physical, mental and moral requirements of their children. His book of songs and games is intended not only for the kindergarten but for the mother to use with her baby. The mottoes and commentaries on them are for the kindergartner's or mother's perusal. It is a work that all those who have the care of young children cannot well do without.

Start of Child Training.—The question is often asked, "How can a mother start the training of her child when it is yet too young to understand what she says?" If the questioner will but consider for a moment she will realize that the education of a human being begins at the moment of birth, continues throughout life, and only ceases when he dies. Every physician will testify to the necessity of forming desirable habits in the period of infancy, when the character is still in a plastic condition. The foundation for habits of punctuality and self-control are easily laid in the infant by accustoming him to a regular life. His meals should be given at stated periods, also his walks and his bath. He should be put to sleep at the same time every day, and gradually he will learn to know what is required of him and cheerfully conform to it.

Crying Children.—Children should be taught that no amount of crying and misbehavior will bring a coveted object which has once been denied them. A child who has thus been indulged once by a thoughtless parent will practice the same tactics another time. Children learn almost intuitively to connect cause and effect. "I cried for it and it was given to me, so it must be my crying that brings me what I want." And they lay that connection of ideas by for future use. In correcting this, as in so many other things, it is the first step that both counts and costs. There may be a scene or two at the outset when the half-formed will of the child is pitted against that of the mother, but what is that in comparison with the value of the final results in the formation of the child's character?

Few mothers realize the harm they can do a child by an unwise lowering of their parental authority.

Over-indulgence.—Over-indulgences in smoking, drinking and other vices are loudly condemned by all right-thinking people. It is an interesting fact that any number of such cases have been traced directly back to the foolish leniency of the mother in allowing in her child excesses in little things. For example, baby is permitted to suck his finger and soon is not happy unless doing so. Finally, the mother notices the act and straightway provides a rubber-ring or something similar to take the finger's place. The child quickly becomes accustomed to the new device, and when the ring is not forthcoming he sucks his cap-string, or anything within reach. Pencils, chewing-gum and candy take the place of the ring when the baby grows into the boy, and finally these give way to cigarettes when manhood is reached. Is it any wonder that a man finds the tobacco habit hard to break. He has been accustomed to having something constantly in his mouth, and with each year the habit grows stronger and his will weaker.

Correction of Overeating.—Eating after the cravings of nature have been satisfied is a common fault in little children, and thoughtless adults will frequently urge them to partake of more food than the stomach can possibly have any use for. This is a fertile cause of ill-health, but far worse than that, it is more injurious to the moral nature. This also applies to the excessive eating of candy and sweet things of which the child is very fond. The continual gratification of the appetite, or in fact of any of the senses, to a point beyond that which common sense dictates, can have but one result, and that is the loss of all self-control.

Children's Pitfalls.—It is far from my wish to discourage any mother in the training of her children by thus pointing out the numerous pitfalls that beset her way. These same pitfalls are many and deep, it is true, but continual watchfulness and a knowledge of wherein the danger lies will do much to keep one in the right path. It is to this in a large measure that the good kindergartner owes her wonderful influence over her small charges. She makes a study of each individual child, his virtues and faults, what he likes and dislikes and, in fact, all the peculiarities of his individual character. Thus she is enabled to correctly attribute his acts to the motives which prompted them and reward or punish the small doer accordingly. For it is a well-known fact that two children may do exactly the same thing—the one from a bad and the other from

a good motive; and a person not understanding the different natures would be likely to treat both in the same manner.

Rewards and Punishments.—The question of rewards and punishments is one of the gravest with which the mother and kindergartner is called upon to deal, for an unjust decision in such a matter is often the cause of much harm to the child. The arbitrator is practically in the position of God to the child who regards her decision as absolutely just and final. One of the saddest things that could happen to a mother is the loss of this faith, and it may safely be said that this loss only comes through her child's knowing that her decisions are unjust. She should be the standard of right and wrong in the eyes of her children, their conscience, so to speak, before their own has completely formed.

When to Enter School.—The age at which any given child may enter school must be decided for that child alone. The individual must be considered. As a rule children are sent to school too early. Strong, robust children may be sent to school at six or seven years of age. They may even have spent two years in the kindergarten before reaching that age. On the other hand a delicate child had better be kept in the open air and sunshine until nine or ten years of age, or even later. It is more important to a child to have a sound body than to have an educated brain.

Development of Puberty.—Puberty is that time of life in a boy or girl when they emerge from boyhood or girlhood into manhood or womanhood. It is a time in the life of most individuals fraught with danger. To the boy approaching puberty, little care need be given except to surround him with good influence and moral companions. Teachers should be patient in cultivating the voice. Singing should not be indulged in until the "new voice" is well established. The boy should be watched so that no bad habits are formed. This period is reached in the average boy in from the fourteenth to the sixteenth year, and at such time as the first manifestations of puberty occur, the father should carefully explain to the boy the nature of the change in his physical state and endeavor to imbue him with ideas of chastity, not only from its moral but also from its physical aspect. There should be no false modesty in such discussion with the son. The boy is certain to become informed of the facts from other boys, and there is always danger that the information may be imparted to him in such manner as will pollute his mind instead of giving him ideas of the nobility of manhood.

Puberty in Girls.—In girls, puberty is reached about the fifteenth year. At this time the mother must seek the girl's closest and strictest

confidence, and before the first menstrual flow occurs it is the mother's duty to explain physical conditions to the child and prepare her for that which is soon to happen. Failure to do this may, and often does, result in mortification, suffering and sometimes permanent injury to the maturing child. She must do no severe mental work at this time, neither should she indulge in violent exercise. When weary and languid, encourage rest in a reclining posture, with short walks in sunshine and fresh air daily. Many girls are better removed from school. The health and future usefulness of many girls are endangered, some even ruined, by injudicious care at this period. Moral companions must be secured at this period of life.

PART I OF BOOK IX

Describes the properties and uses of many simple remedies which should be in every home, giving also a number of instruments and articles which will be found very useful in the home treatment of disease.

Absorbent Cotton 1206
Alcohol 1203
Antiseptic Gauze Bandage 1206
Aromatic Spirits of Ammonia 1201
Bandages 1206
Bicarbonate of Soda 1205
Bismuth, Subnitrate of 1204
Boric Acid 1206
Bromide of Soda 1204
Brown Mixture 1204
Cabinet for Medicines 1207
Calomel 1205
Camphor, Spirits of 1203
Camphorated Soap Liniment 1203
Chalk Mixture 1204
Chlorate of Potash 1206
Chloroform Liniment 1203
Chlorinated Lime 1205
Cold Cream 1206
Coryza 1204
Dropping Medicine 1200
Essence of Ginger 1202
Ginger, Essence of 1202
Ground Mustard 1205
Home Medicine Chest 1199
Household Remedies 1201
How to Dispense Medicines 1200
How to Keep Medicines 1199
Ideal Home Medicine Chest 1199
Implements 1206
Ipecac, Syrup of 1201
Laudanum 1202
  and Lead Water 1203
Lead Water and Laudanum 1203
Lime-water 1204
Lint Bandages 1206
Liquid Medicines 1201
Measuring Medicine 1200
Medicine Chest 1199
  Convenience 1199
  Purpose of 1199
Miscellaneous Medicines 1205
Mustard, Ground 1205
Mustard Plasters 1206
Nitre, Spirits of 1202
Paregoric 1202
Pepsin 1204
Peroxide of Hydrogen 1203
Plasters 1206
  Mustard 1206
  Toothache 1206
Pouring Medicine 1200
Remedies, Household 1201
Rhynitis 1204
Seidlitz Powders 1205
Soda 1205
Spirits of Camphor 1203
Spirits of Turpentine 1203
Subnitrate of Bismuth 1204
Sulphate of Quinine 1204
Sweet Oil and Spirits of Turpentine. 1203
Sweet Spirits of Nitre 1202
Syrup of Ipecac 1201
Tablets 1204
Toothache Plasters 1206
Turpentine, Spirits of 1203
Valerianate of Ammonia 1201
Vaseline 1206
Whiskey 1201
Witch-hazel 1203
Zinc Ointment 1206

Book IX

Home Administration of Medicine

PART I.

THE IDEAL HOME MEDICINE CHEST

Purpose.—The purpose of the home medicine chest should not be to displace the family physician, nor to take out of his hands the work that legitimately belongs to him, but rather to afford a convenient and ready means for giving relief in cases of minor indisposition where the physician would in all likelihood not be summoned, and in severe ailments for giving temporary treatment while awaiting his arrival. The intelligent mother who is watchful for any departure from the normal in her children, can often, if suitable remedies of a simple nature be at hand, prevent the development of more serious maladies.

Convenience.—Moreover, even among adults, it is often a convenience and a safeguard to have available such medicines as they will be most likely to have occasion to use in emergencies or in the absence of medical aid. The small expenditure of money required to procure such an outfit will be amply repaid by the peace of mind and ease of body which it will give. Before entering upon a detailed consideration of the remedies which it is desirable to keep in stock, a few suggestions as to the handling of medicines in general will not be inappropriate.

1. **How to Keep Medicines.**—All medicines should be plainly labeled, with their names, doses and general directions for use written in ink. Unless for temporary use only, liquids should be kept in glass-stoppered bottles. Never should a bottle be used which has contained something else, unless it has been thoroughly cleansed and the old label either scraped off or sufficiently defaced to prevent recognition. It is unsafe to simply paste a new label on top of the old one unless this precaution is observed,

for the new one may not adhere, but may fall off, and occasion liability to error.

All poisonous liquids should be in blue or other dark-colored bottles and should have some distinctive characteristic to the touch, as a rough surface. They should be plainly marked *"Poison,"* with directions to follow in case of poisoning by an overdose or otherwise. They should also be placed in a less accessible part of the medicine chest or closet, so as to make it more difficult to obtain them.

2. **How to Dispense Medicines.**—Medicines should *never* be poured out and administered without first reading the label. No matter what degree of certainty may exist that the right medicine is being employed, errors are liable to occur, and the most careful people may under some circumstances make mistakes. Accordingly the risk of these errors should be reduced to a minimum by a scrupulous regard for this rule, a failure to adhere to which may cause, as it often has, suffering and death. Again medicines should never be poured out into a cup or glass and allowed to stand, unless proper precautions are taken to prevent the contents of the vessel being mistaken for something else.

Pouring.—In pouring medicine from a bottle into a measuring glass the latter should be held perfectly straight, on a level with the eye, and the medicine slowly poured out from the side opposite the label, in order to prevent soiling the latter by drops running down the outside of the bottle.

Dropping.—In dropping medicines, if a dropper is not available, the lip of the bottle should be moistened by touching it in one spot with the stopper on which is a drop of the medicine. By so tilting the bottle that the moistened part of the lip rests against the side of the stopper at an angle of about forty-five degrees, the liquid may be accurately and readily dropped out, if the hand is at all steady.

Measuring.—In measuring liquids in spoons, two teaspoonfuls equal one dessertspoonful, two dessertspoonfuls equal one tablespoonful, and four tablespoonfuls one wineglassful. The size of spoons, however, varies considerably, so that they are unreliable for accurate dosage.

Unless directions to the contrary are given it is always safer to dilute medicines freely. A little water added to a dose of medicine rarely diminishes its efficacy, whereas in its pure form it may often be too strong and may do harm.

USEFUL REMEDIES FOR THE HOUSEHOLD.

Number of Remedies.—To be of practical value in the home the number of such remedies to be recommended for use among the untrained must necessarily not be large, nor their nature complex, but such as with ordinary care may be used without risk, and such as with ordinary intelligence may be employed in the most common of the simpler ailments. Accordingly, the following are suggested as fulfilling these conditions. Departure from this schedule may of course be made according as individual preference, experience, and the advice of the family physician may dictate.

LIQUID MEDICINES.

1. **Aromatic Spirits of Ammonia,** two ounces of.—This is a diffusible stimulant, acting quickly as a restorative in cases of fainting or heart failure. Its effect as a stimulant does not last a great while. It should be cautiously held to the nostrils for the patient to inhale, and as soon as he can swallow a half teaspoonful should be given, diluted with a wineglassful of water, care being taken not to cause choking by administering too rapidly. Children may take ten drops at a dose.

It is useful also for the relief of sick stomach and of headache dependent on disordered stomach. It may also be of benefit in coughs, after these have become loose, to aid in expectoration. For this purpose it should be taken every hour or two.

Label.—For faintness, dizziness, nausea and headache.

Dose.—Adults, a half teaspoonful; children, ten drops, well diluted.

2. **Whiskey,** four ounces of.—As a stimulant this acts less quickly than the former, but its effect is of longer duration.

Label.—Stimulant.

Dose.—Adults, a tablespoonful; children, a half teaspoonful, in water.

3. **Elixir of Valerianate of Ammonia,** four ounces of.—This is useful for nervousness, hysterical attacks and nervous headache. A teaspoonful or two may be given every hour until relief is obtained, in a wineglassful of water.

Label.—For nervousness, and nervous headache.

Dose.—Adults, a teaspoonful; children, ten drops, in water.

4. **Syrup of Ipecac,** two ounces of.—This is a safe and efficient emetic when it is desired to empty the stomach of undigested food or to relieve

an attack of spasmodic croup. For a child a teaspoonful should be given, to be repeated if necessary in a half hour. Vomiting usually occurs in about twenty minutes without previous nausea and without warning. In dry, harsh coughs, from five to fifteen drops every two hours, aids in loosening the cough and aiding expectoration.

LABEL.—As an emetic.

DOSE.—A tablespoonful for an adult; a teaspoonful for a child. As an expectorant, thirty drops for an adult; ten drops for a child.

5. **Sweet Spirits of Nitre,** one ounce of.—For the relief of slight fever, and to promote the action of the skin and kidneys, this remedy has long been popular in domestic use. It should, however, not be kept a great while as age causes it to deteriorate. An adult may take a half to one teaspoonful in a wineglassful of water and a child from five to ten drops.

LABEL.—For fever.

DOSE.—Adults, a half teaspoonful; children, five to ten drops.

6. **Essence of Ginger,** four ounces of.—This is serviceable for flatulence and colic. A teaspoonful for an adult or from fifteen to thirty drops for a child; should be taken freely diluted with hot water, and may be repeated in a half hour if necessary.

LABEL.—For colic and flatulence.

DOSE.—Adults, a teaspoonful; children, fifteen to thirty drops, well diluted.

7. **Paregoric,** two ounces of.—Its most frequent use is for the relief of pain. As it contains opium its use for infants and children should be guarded, and usually only under the supervision of a medical attendant. Nevertheless a few small doses may be given with safety in such ailments as colic and in diarrhœa, after any undigested substances have been gotten rid of by a number of movements. It is of special benefit in diarrhœa accompanied by pain. An adult may take a teaspoonful in a little water every two hours, a child ten drops or an infant two drops. A dose at the very beginning of a cold will often check it. An irritating cough is also often relieved by moderate doses of fifteen or twenty drops every two hours.

LABEL.—For pain and diarrhœa.

DOSE.—Adults, a teaspoonful; children, ten drops.

8. **Laudanum,** four ounces of.—As this contains a much larger proportion of opium than paregoric, still greater care should be observed in its employment, and whenever it is possible to use the milder preparation, as is usually the case for internal administration, this should be done.

Laudanum is, however, invaluable, locally applied, in painful injuries, as bruises, sprains, etc. Equal parts of laudanum and water are useful for this purpose. The dose internally for adults is from ten to twenty drops, and for children two or three drops. It should not be used for infants without the direction of a physician.

LABEL.—*Poison.*

DOSE.—Adults, fifteen drops for pain; antidote, produce vomiting by a teaspoonful of mustard in a cup of warm water. Give hot coffee internally and by injection.

9. **Alcohol,** eight ounces of.—This is useful as an evaporating lotion in headache and sprains, either pure or diluted with an equal amount of water. Sponging the surface of the body frequently with alcohol and water, in fevers, helps to reduce the temperature and adds to the comfort of the patient. In all cases where the patient is confined to bed for any length of time alcohol added to the bath is useful to aid in cleansing the surface and in preventing the patient from taking cold.

10. **Peroxide of Hydrogen,** four ounces of.—This is used as a disinfectant for open wounds. Being non-poisonous, it is especially well adapted for use by non-professional hands. When it comes in contact with blood or pus active effervescence takes place. In sore throat, diphtheria, etc., it is valuable, diluted with an equal amount of water, as a gargle. It should be kept tightly corked.

11. **Camphorated Soap Liniment, or Chloroform Liniment,** four ounces of.—Useful in sprains, muscular soreness, rheumatic affections of the muscles, and as a counter-irritant to the chest in cases of bronchitis.

12. **Spirits of Camphor,** two ounces of. This may be used locally for headaches, bites of insects, etc., and inhaled through the nostrils for colds.

13. **Spirits of Turpentine,** four ounces of. This is for external use and will be found of value in making turpentine stupes and also as an ingredient in making liniments.

14. **Lime Water and Linseed Oil (equal parts),** four ounces of. This is sometimes called carron oil and should be kept handy for burns of any description.

15. **Witch-hazel,** one pint of. This is for local use in bruises, sprains, application to hemorrhoids, etc.

16. **Lead Water and Laudanum,** eight ounces of. This is for external use only. It is useful for sprains of all kinds and for reducing swellings.

TABLETS.

The use of compressed tablets has become so universal that a list of convenient remedies in this form is given. They economize space, are inexpensive and often more agreeable to take than liquid medicines. They are conveniently kept in wide-mouthed bottles, each containing an ounce, and provided with screw caps.

1. **Subnitrate of Bismuth,** fifty tablets of, each containing five grains. —This is a non-poisonous and efficient remedy for nausea, vomiting and diarrhœa. As it is tasteless it is easily administered to children, mixed with a few drops of water after crushing it. The dose may be repeated every hour even to young children.

2. **Chalk Mixture,** fifty tablets of.—These are so made that each tablet when crushed and mixed with water represents a teaspoonful of chalk mixture. In diarrhœa, especially of children and infants, this makes an efficient remedy, aiding in the correction of an acid condition of the intestinal discharges. The dose may be repeated every two hours.

3. **Lime-water,** one hundred or more tablets of.—These are made so that each, when dissolved in a teaspoonful of water, shall represent a teaspoonful of lime-water, and are used in sick stomach. Added to milk, in the proportion of one or two tablespoonfuls of the prepared lime-water to a half tumblerful of milk, the "biliousness" of which many people complain when taking milk is usually obviated.

4. **Pepsin,** fifty tablets of, each containing five grains.—These are used for indigestion, one being given at each meal time. In the diarrhœa of infants, which is caused by a failure to properly digest their food, this is often markedly beneficial.

5. **Bromide of Soda,** fifty tablets of, each containing five grains.—In headache and sleeplessness from nervous conditions and overfatigue, one of these may be taken every two hours, a child taking half that amount.

6. **Brown Mixture,** fifty tablets of.—These are made to represent a teaspoonful of the liquid medicine. For coughs of a bronchial character a tablet may be taken every two hours.

7. **Sulphate of Quinine,** fifty tablets of, each containing two grains.— In malarial conditions one may be taken every three or four hours. As a general tonic one three times a day will be useful. At the beginning of a cold ten grains will often check its progress.

8. **Coryza or Rhinitis,** one hundred of. These are effective in the

early stages of coryza or cold in the head. One or two may be given every one or two hours for three or four hours.

9. **Calomel (1-10 grain), or Calomel and Soda,** one hundred of. One may be given every hour until twelve or fifteen have been given. They act on the liver and increase the flow of bile.

10. **Cascara (three grains),** one hundred of. These produce a mild action on the bowels and can be given at any time without producing ill effect.

MISCELLANEOUS MEDICINES.

Seidlitz Powders, Twelve.—1. Each dose consists of two powders wrapped in papers of different colors to distinguish them. One powder of each color is dissolved in a third of a glass of water, separately, the two solutions are mixed and taken while effervescing.

Cases of acute indigestion and acute constipation, and of headache dependent on these conditions, are often promptly relieved by their administration.

Chlorinated Lime.—2. One-half pound of chlorinated lime, commonly known as chloride of lime, in a hermetically sealed package. This is for disinfecting purposes, a solution of it being used in the strength of one to twenty parts, for pouring down the drain-pipes and into the utensils used for receiving the discharges of the patient. If economy of space is not an object a quart bottle of Platt's chlorides or of electrozone will be found more convenient.

Ground Mustard.—3. One-quarter pound can of ground mustard. This is useful as an emetic, from one to four teaspoonfuls being stirred into a pint of warm water. Externally, as a counter-irritant, it is employed in the form of poultices, either pure or mixed with two or three parts of flour, to which may advantageously be added the white of an egg. Cases in which there is an excess of blood in the head, usually producing headache, are benefited by a foot-bath, into which a tablespoonful of mustard has been stirred.

Bicarbonate of Soda.—4. Two ounces of bicarbonate of soda. In some forms of indigestion, a pinch of soda taken before meals will be of assistance, whereas other cases are more benefited by taking it after meals. In cases of burns where the skin is not broken, soda applied after moistening the surface often affords relief to the pain. The same may be said of the stings of bees and insects. When the urine is acid, as is often the case in rheumatism, and when there is an irritable bladder, a good-sized

pinch of soda in a little water taken every hour will aid in restoring the normal condition.

Chlorate of Potash.—5. Two ounces of chlorate of potash. A saturated solution of this in water is of value as a gargle in sore throat and sore mouth.

Boric Acid.—6. Two ounces of powdered boric acid. This has mild antiseptic properties and is good to dust on open wounds, abrasions, and so forth. A teaspoonful in a cup of boiled water, first mixing it into a paste, before adding the entire bulk of water, is beneficial in mild cases of sore eyes, or inflamed lids.

Vaseline.—7. Two ounces of carbolized vaseline. This is also a good antiseptic dressing. In burns and open wounds it is healing and soothing.

Zinc Ointment.—8. Two ounces of benzoinated oxide of zinc ointment. This is soothing and healing, though less antiseptic than the former. In many of the milder forms of skin diseases and as a dressing for open wounds when the healing process is nearly completed this may be used.

Toothache Plasters.—9. One box of toothache plasters. These are small plasters containing red pepper and other ingredients, which are applied to the gum of the aching tooth and often with marked relief.

10. **Mustard Plasters.**—These can be secured in any quantity. They are simply moistened with warm water and applied when needed.

11. **Absorbent Cotton and Lint Bandages.**—These can be used for many conditions and are especially useful in cases of accident.

12. **Antiseptic Gauze Bandages.**—These can be procured in various widths and are invaluable in dressing wounds, cuts, etc., or in applying to an injury or fracture.

13. **Cold Cream,** two ounces of. This is a pleasant and effective application for rough skin, cold-sores, etc., or as a mild application for any condition.

Implements.—In addition to the drugs and remedies above enumerated there are a number of appliances which should be in every medicine chest, the mere mention of which will in most instances be all that is required:

One pair of sharp scissors about four and a half inches long.

One glass piston syringe, preferably with soft rubber tip, to contain about two teaspoonfuls.

One medicine dropper.

One roll of prepared lint for dressings.

One-quarter pound absorbent cotton.

Six roller bandages, each three inches wide and five yards long, in aseptic packages, obtainable at supply stores for physicians' instruments, or at drug stores.

One graduated medicine glass, marked to indicate teaspoonful, dessertspoonful, tablespoonful and wineglassful.

One box prepared mustard plasters.

One spool adhesive plaster, one or two inches wide. To be used only on perfectly clean, dry surface.

One fountain syringe.

One hot-water bag.

One clinical thermometer, self-registering.

One bundle of yucca wood, a material for splints. This is prepared in thin strips three and a half by eighteen inches, is a porous light wood, which, when moistened, can be made to conform to any shape desired, and when allowed to dry will retain that shape.

One alcohol lamp or one appliance to rest over the gas fixture for heating liquids.

Accommodation of Medicines and Appliances.—A small cabinet, or a shelf in a closet, or preferably a wooden box, should be provided. If the latter, the articles described under implements should be kept in a tray or drawer about four inches deep, the smaller appliances being in a separate section or box.

The medicines should be below the tray, the liquids in one section, the solids in another.

A box about twelve by eighteen inches, inside measurement, and ten inches high will accommodate all the articles described. It should be provided with lock and key, but the latter should be attached to the handle of the chest or be in such an accessible place that it will not be mislaid.

PART II OF BOOK IX

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Home Administration of Medicine

PART II.

FOODS AND THEIR DIGESTION

FOOD HYGIENE.

The world is fast awakening to the realization of the fact that inefficiency and crime are closely connected with under-nourishment. Many of the cures effected in hospitals are the results of living under proper hygienic conditions and not the least of these is the right kind and amount of food. Every mother should study the needs of her child and furnish as near as in her power the proper nourishment for his growing body.

The amount of food that an individual requires varies with the size of the individual and the kind of work he is doing. A clerk or a bookkeeper requires much less food than one who has walked behind the plow all day.

Some years ago a Canadian workman received an injury to the stomach which enabled Dr. Beaumont to make a series of experiments and observations upon the process of digestion which have been of great value. Dr. Beaumont's list of foods arranged in the order of their digestibility is as follows: Rice, tripe, whipped eggs, sago, tapioca, barley, boiled milk, raw eggs, lamb, roasted and baked potatoes, fricasseed chicken. Rice in one hour, fricasseed chicken in two and three-quarter hours, roast beef in three hours. A mixed diet is absolutely necessary for man. Many people suffer from excess of animal food—especially is this true of Americans—but since the cost of meat has advanced so greatly it is hoped the diseases caused by excessive meat diet may diminish. People living upon strictly vegetable diet have too small an amount of albuminous matter for any degree of muscle. The Chinese and Japanese are often cited as proof to the contrary, but while they live principally upon rice, their diet is supplemented by eggs, fish, pork and chicken.

The nutritive value of meat is due to the presence of the proteids, fats and mineral salts, the carbohydrates existing only in very small quantities.

Meat properly roasted or broiled is more easily digested than when boiled or fried. Red meats contain a large amount of nitrogenous substance which is irritating to the kidneys. It is therefore prohibited to rheumatic patients and those suffering from diseases of the kidneys.

Milk becomes a source of danger unless handled with the greatest of care. To obtain pure milk it is essential that the cow be not diseased, that the dairy is clean, and the methods of milking are clean. Pasteurized milk is the only safe method of receiving it into the home. And every conscientious mother investigates the source of the milk supply furnished her family. Cases of milk poisoning, many of them fatal, are due to the presence of certain bacteria found in unclean milk. Milk bottles should be inspected and milk cans washed in boiling water and afterwards exposed to the sun and air. Ice cream freezers should be sweet and clean. especially free from rust. More cases of ptomaine poisoning have been the result of rusty freezers than from any other cause. The regulations regarding milk have greatly improved in cities during recent years, but much remains to be done in the rural districts along that line.

Bread is the most generally used food known. Wheat being the nutritious cereal and containing gluten, is the best adapted to bread making. It should not be too white as that shows a lack of gluten. Good flour holds together in a mass when squeezed by the hand and retains the impressions of the fingers longer than poor flour, which is sticky and will spread itself upon the board instead of remaining in a round shape. Bread must be white, sweet and spongy. Damp, mouldy bread causes serious digestive disturbances. Baking powders containing alum should be avoided. The combination of bircarbonate of soda with sour milk is a wholesome "leaven" and better to use than baking powders.

Vegetables.—In preparing vegetables care should be taken in cleaning them properly. Germs of infectious diseases, such as typhoid fever, are found in some fertilizers and vegetables washed in polluted water may also be a source of infection.

Fruits when ripe are wholesome and easily digested. Children should be encouraged in eating apples and prunes, especially before going to bed. Many times they serve as laxatives without the aid of medicines. Bananas and figs are the most nutritious fruits and are staple articles of food in the Southern countries.

Cocoa and Chocolate contain about 50 per cent. of fat and are most nourishing beverages. They should be used with milk for children instead of tea and coffee, both of which are absolutely wrong to give a child under twelve years of age.

TABLE OF DIGESTION.

ALIMENTS.	Form of Preparation.	Time Required for Stomachical Digestion.
Apples—mellow	Raw	2 hours
Apples—sour, hard	Raw	2 hours, 50 minutes
Apples—sweet, mellow	Raw	1 hour, 50 minutes
Barley	Boiled	2 hours
Bass—fresh	Broiled	3 hours
Beans—pod	Boiled	2 hours, 30 minutes
Beans and Green Corn	Boiled	3 hours, 45 minutes
Beef—fresh, lean, rare	Roasted	3 hours
Beef—fresh, lean, dry	Roasted	3 hours, 30 minutes
Beef—fresh steak	Broiled	3 hours
Beef—with salt only	Broiled	2 hours, 45 minutes
Beef—with mustard, and so forth	Broiled	3 hours, 30 minutes
Beef	Fried	4 hours
Beef—old hard, salted	Boiled	4 hours, 15 minutes
Beets	Boiled	3 hours, 45 minutes
Brains—animal	Boiled	1 hour, 45 minutes
Bread—corn	Baked	3 hours, 15 minutes
Bread—wheat, fresh	Baked	3 hours, 30 minutes
Butter	Melted	3 hours, 30 minutes
Cabbage—head	Raw	2 hours, 30 minutes
Cabbage—with vinegar	Raw	2 hours, 30 minutes
Cabbage	Boiled	2 hours
Cake—corn	Baked	4 hours, 30 minutes
Cake—sponge	Baked	3 hours
Carrot	Boiled	2 hours, 30 minutes
Cartilage	Boiled	3 hours, 15 minutes
Catfish—fresh	Fried	4 hours, 15 minutes
Cheese—old, strong	Raw	3 hours, 30 minutes
Chicken	Fricassee	3 hours, 30 minutes
Codfish—cured, dry	Boiled	2 hours, 45 minutes
Corn (green) and Beans	Boiled	2 hours
Custard	Baked	3 hours, 45 minutes
Duck—domesticated	Roasted	2 hours, 45 minutes
Duck—wild	Roasted	4 hours
Dumpling—apple	Boiled	4 hours, 30 minutes
Eggs—fresh	Hard boiled	3 hours
Eggs—fresh	Soft boiled	3 hours, 30 minutes
Eggs—fresh	Fried	3 hours, 30 minutes
Eggs—fresh	Roasted	2 hours, 15 minutes

ALIMENTS.	Form of Preparation.	Time Required for Stomachical Digestion.
Eggs—fresh	Raw	2 hours
Eggs—fresh	Whipped	1 hour, 30 minutes
Flounder—fresh	Fried	3 hours, 30 minutes
Fowls—domestic	Boiled	4 hours
Fowls—domestic	Roasted	4 hours
Gelatin	Boiled	2 hours, 30 minutes
Goose—wild	Roasted	2 hours, 30 minutes
Heart—animal	Fried	4 hours
Lamb—fresh	Boiled	2 hours, 30 minutes
Liver—beef's, fresh	Boiled	2 hours
Marrow—animal, spinal	Boiled	2 hours, 40 minutes
Meat and Vegetables	Hashed	2 hours, 30 minutes
Milk	Boiled	2 hours
Milk	Raw	2 hours, 15 minutes
Mutton—fresh	Roasted	3 hours, 15 minutes
Mutton—fresh	Broiled	3 hours
Mutton—fresh	Boiled	3 hours
Oysters—fresh	Raw	2 hours, 55 minutes
Oysters—fresh	Roasted	3 hours, 15 minutes
Oysters—fresh	Stewed	3 hours, 30 minutes
Parsnips	Boiled	2 hours, 30 minutes
Pig—suckling	Roasted	2 hours, 30 minutes
Pig's-feet—soused	Boiled	1 hour
Pork—fat and lean	Roasted	5 hours, 15 minutes
Pork—recently salted	Boiled	4 hours, 30 minutes
Pork—recently salted	Fried	4 hours, 15 minutes
Pork—recently salted	Broiled	3 hours, 15 minutes
Pork—recently salted	Raw	3 hours
Pork—recently salted	Stewed	3 hours
Potatoes—Irish	Boiled	3 hours, 30 minutes
Potatoes—Irish	Roasted	2 hours, 30 minutes
Potatoes—Irish	Baked	3 hours, 20 minutes
Rice	Boiled	1 hour
Sago	Boiled	1 hour, 45 minutes
Salmon—salted	Boiled	4 hours
Sausage—fresh	Broiled	3 hours, 20 minutes
Soup—barley	Boiled	1 hour, 30 minutes
Soup—bean	Boiled	3 hours
Soup—beef, vegetables and bread	Boiled	4 hours
Soup—chicken	Boiled	3 hours
Soup—marrow bones	Boiled	4 hours, 15 minutes
Soup—mutton	Boiled	3 hours, 20 minutes
Soup—oyster	Boiled	3 hours, 30 minutes
Suet—beef, fresh	Boiled	5 hours, 30 minutes
Suet—mutton	Boiled	4 hours, 30 minutes
Tapioca	Boiled	2 hours
Tendon—boiled	Boiled	5 hours, 30 minutes

ALIMENTS.	Form of Preparation.	Time Required for Stomachical Digestion.
Tripe—soused	Boiled	1 hour
Trout—salmon, fresh	Boiled	1 hour, 30 minutes
Trout—salmon, fresh	Fried	1 hour, 30 minutes
Turkey—domestic	Roasted	2 hours, 30 minutes
Turkey—domestic	Boiled	2 hours, 25 minutes
Turkey—wild	Roasted	2 hours, 18 minutes
Turnips	Boiled	3 hours, 30 minutes
Veal—fresh	Broiled	4 hours
Veal—fresh	Fried	4 hours, 30 minutes
Vegetables and Meat—hashed	Warmed	2 hours, 30 minutes
Venison—steak	Broiled	1 hour, 35 minutes

FOOD COMPOSITIONS

Cow's Milk.—In 100 parts—

Water	86.8
Albuminoids	4
Fats	3.7 to 4.50
Sugar	4.8
Salts	0.7

Butter.—In 100 parts—

Fats	88
Albuminoids	3.3
Water	6
Salts (variable)	2.7

Cheese.—In 100 parts—

Fats	24.3
Albuminoids	33.5
Water	36.8
Salts	5.4

White Wheaten Bread.—In 100 parts—

Carbohydrates	50.2
Albuminoids (nitrogenized matters)	7.5
Salts	1.6
Fats	1.5
Water	39.2

Oatmeal.—In 100 parts—

Water	15
Albuminoids	12.6
Fats	5.6
Carbohydrates	63
Salts	3

Rice.—In 100 parts—

Water	10
Albuminoids	5
Fats	0.8
Carbohydrates	83.
Salts	0.5

Maize, Indian Corn.—In 100 parts—

Water	13.5
Albuminoids	10
Fats	6.7
Carbohydrates	64.5
Salts	1.4

Peas.—In 100 parts—

Water	15
Albuminoids	22
Fats	2
Carbohydrates	53
Salts	2.4

Potato.—In 100 parts—

Water	74
Albuminoids	2
Fats	0.16
Carbohydrates	21
Salts	1

Egg.—Ten per cent. of weight deducted for shell.

Water	73.5
Albuminoids	13.5
Fats	11.6
Salts	1.4

Eggs, Yolk.—

Water	51.5
Albuminoids	15
Fats	30
Salts	1.5

Eggs, White.—

Water	84.5
Albuminoids	13.5
Fats	3
Salts	1.3

Beef.—Little fat; best quality.

Water	74.4
Albuminoids	20.5
Fats	3.5
Salts	1.6

Beef.—Roast or boiled, with drippings.

Water	54
Albuminoids	27.6
Fats	15.45
Salts	2.95

Pork, Salt.—

Water	44.1
Albuminoids	26.1
Fats	7
Salts	22.8

Smoked Ham.—

Water	27.8
Albuminoids	24
Fats	36.5
Salts	10.1

Poultry.—

Water	74
Albuminoids	21
Fats	38
Salts	1.2

(*Letheby.*)

Chicago Corned Beef.—

Water	52.2
Albuminoids	23.3
Fats	14
Salts	4

TIME REQUIRED FOR BOILING.

(Much depends upon the freshness and age of the articles.)

For each pound of corned beef	30 minutes
For each pound of beef	15 to 30 minutes
For each pound of veal	15 to 20 minutes
For shoulder of mutton weighing 5 to 6 pounds	1 hour
For leg of mutton, for each pound	20 minutes
For leg of lamb	15 minutes
For tongue of beef	4 hours
For ham, for each pound	½ hour
For turkey, for each pound	20 minutes
For brill	10 to 15 minutes
For turbot (4 to 5 pounds)	20 to 30 minutes
For haddock	15 to 30 minutes
For mackerel	20 to 30 minutes
For salmon, to each pound	8 minutes
For skate	30 to 60 minutes
For whiting	5 to 15 minutes
For cod (only simmer)	1 hour
For fish in general, to each pound	10 minutes
For carrots	1 hour
For turnips, parsnips, cabbage, seakale	1 hour
For cauliflower, onions, beans (young)	1 hour
For peas (young), squash (spring)	½ hour
For dried peas	2 hours
For winter squash (steam)	2 hours
For oyster-plant	1 hour
For beets (young)	1 to 2 hours
For beets (old)	3 to 8 hours
For asparagus (young)	½ hour
For asparagus (old)	1 hour
For artichokes	1 hour
For winter carrots, parsnips, turnips and cabbage	2 hours
For corn	10 to 15 minutes

TIME REQUIRED FOR ROASTING.

For beef (rare), to each pound	10 minutes
For beef (well-done), to each pound	15 to 20 minutes
For mutton, to each pound	15 minutes
For veal, to each pound	20 minutes
For turkey, to each pound	10 to 12 minutes
For duck (game)	½ hour
For duck (tame)	1 hour
For capon	50 to 60 minutes
For fowl	60 minutes
For pigeon	15 to 30 minutes
For pheasant	35 minutes
For partridge, woodcock or plovers	15 minutes
For grouse, snipe, small birds	20 minutes
For larks	6 minutes
For hare	1½ hours
For rabbits	20 to 60 minutes
For goose	2 hours

TIME REQUIRED FOR BAKING.

For potatoes (with or without skins)	1 hour
For egg-plant and tomatoes	1 hour
For omelet	15 to 20 minutes
For eggs (until they set)	15 to 20 minutes
For shad	1 hour
For cod, black fish and haddock, 4 pounds	1 hour
For fish generally, 4 to 6 pounds	1 hour
For clams	20 minutes

PERCENTAGE OF NUTRITION IN VARIOUS ARTICLES OF FOOD.

Raw Cucumbers	2
Raw Melons	3
Boiled Turnips	4½
Milk	7
Cabbage	7½
Currants	10
Whipped Eggs	13
Beets	14
Apples	16
Peaches	20
Boiled Codfish	21
Broiled Venison	22
Potatoes	22½
Fried Veal	24
Roast Pork	24
Roast Poultry	26
Raw Beef	26
Raw Grapes	27
Raw Plums	29
Broiled Mutton	30
Oatmeal Porridge	75
Rye Bread	79
Boiled Beans	87
Boiled Rice	88
Barley Bread	88
Wheat Bread	90
Baked Corn Bread	91
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WARMTH AND STRENGTH DERIVED FROM VARIOUS ARTICLES OF FOOD AND DRINK.

GRAINS OF STRENGTH YIELDED BY ONE POUND OF 7,000 GRAINS.

	Grains.
Beer or Porter	1
Parsnips	12
Turnips	12
Whey	13
Greens	14
Skimmed Milk	34
New Milk	35
Buttermilk	35
Barley	70
Rice	70
Bacon	78
Rye Bread	89
Baker's Bread	90
Pearl Barley	91
Fresh Pork	108
Seconds Flour	120
Cornmeal	125
Fresh Fish	129
Cocoa	130
Oatmeal	140
Mutton	140
Fresh Beef	172
Beef Liver	200
Split Peas	250
Cheddar Cheese	310
Skim Milk Cheese	360

GRAINS OF WARMTH YIELDED BY ONE POUND OF 7,000 GRAINS.

	Grains.
Whey	150
Turnips	238
Beer and Porter	315
Buttermilk	335
Skimmed Milk	351
New Milk	378
Carrots	399
Parsnips	425
Potatoes	770
Fresh Fish	980
Beef Liver	1,220
Red Herrings	1,455
Baker's Bread	1,990
Fresh Beef	2,300
Molasses	2,300
Skim Milk Cheese	2,350
Cheddar Cheese	2,550
Seconds Flour	2,700
Rye Bread	2,700
Rice	2,750
Barley Meal	2,780
Indian Meal	2,800
Sugar	2,900
Fresh Pork	3,100
Bacon	4,200
Butter	4,700
Lard	4,800
Drippings	5,500

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Gives the various weights and measures used in medicine, tables of doses and several statistical tables.

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PART III.

TABLES OF WEIGHTS AND MEASURES

Table of Weights and Measures Used in the Preparation of Medicines—Doses and So Forth.

SOLID.

20 grains equal 1 scruple equals 20 grains.
60 grains equal 1 drachm equals 3 scruples.
480 grains equal 1 ounce equals 8 drachms.
5760 grains equal 1 pound equals 12 ounces.

In some places the use of the terms scruple and drachm have been discarded; and where formerly wine measure was employed, what is known as Imperial measure is now used.

LIQUID.

In mixing medicines measures of capacity are now frequently used. The following tables of Minims and their equivalents will be found useful:

60 minims equal 1 fluid drachm equals 60 minims.
480 minims equal 1 fluid ounce equals 8 fluid drachms.
9600 minims equal 1 pint equals 16 fluid ounces
76800 minims equal 1 gallon equals 8 pints.

A minim is the smallest liquid measure, being equal to about one drop. The minim, however, is an exact measurement, being 1-60th part of a fluid drachm; and it is indicated on all properly graduated medicine glasses, while the drop varies somewhat according to the consistency of the fluid, and is also affected by the vessel or utensil from which the medicine is dropped, as for instance one medicine dropper may have a larger

opening than another and the quantity of medicine will vary accordingly.

It follows that when exact measurement is required it is always best to use the minim instead of the drop.

A TABLE OF APPROXIMATE EQUIVALENTS.

A tumbler contains about 8 fluid ounces. A teacup contains about 4 fluid ounces. A wineglass contains about 2 fluid ounces or 4 tablespoonfuls. A tablespoon contains about one-half a fluid ounce or 4 fluid drams. A dessertspoon contains about one-fourth a fluid ounce or 2 fluid drams. A teaspoon contains about one fluid dram.

One teaspoonful equals 60 to 80 drops. Four large tablespoonfuls equal one-half gill. Eight large tablespoonfuls equal one gill. Sixteen large tablespoonfuls equal one-half pint.

The sizes of spoons vary considerably and therefore cannot be relied upon for accurate measurements. Where this is necessary graduated glass must be used.

TABLE FOR REGULATING THE DOSES OF MEDICINE

Take the dose for an adult as one teaspoonful:

1 year old	dose 5 drops
2 years old	dose 7 drops
3 years old	dose 10 drops
4 years old	dose 15 drops
7 years old	dose 20 drops
14 years old	dose 30 drops
20 years old	dose 40 drops
From 20 to 60 years old	dose 60 drops

GRADUATED TABLE FOR ADMINISTERING LAUDANUM.

For a child at birth, or 1 month old	½ to 1 drop
Under a year old	½ to 3 drops
From 1 to 2 years	1 to 5 drops
From 2 to 5 years	2 to 8 drops
From 5 to 10 years	5 to 15 drops
From 10 to 15 years	10 to 20 drops
At 15 years	15 to 20 drops
For an adult	25 to 30 drops

METRIC SYSTEM OF WEIGHTS AND MEASURES.

1 kilogram equals 2.2 avoirdupois pounds.
500 grams equal 17 avoirdupois ounces plus 279 grs.
453.6 grams equal 16 avoirdupois ounces (1 pound).
31.1 grams equal 1 troy ounce (480 grs.).
30 grams equal 1 avoirdupois ounce plus 25 grs.
28.3 grams equal 1 avoirdupois ounce (437.5 grs.).
1 gram equals 15.43 grs.
0.1 gram (1 decigram) equals 1½ grs.
0.065 gram equals 1 gr.
0.01 gram (1 centigram) equals 1-6 gr.
0.001 gram (1 milligram) equals 1-65 gr.
1 liter equals 33.8 fluid ounces.
946 cc. equal 32 fluid ounces (1 quart).
500 cc. equal 16.9 fluid ounces.
473 cc. equal 16 fluid ounces (1 pint).
100 cc. equal 3.38 fluid ounces.
30 cc. equal 1 fluid ounce.
15 cc. equal 4 fluid drachms.
1 cc. equals 16.2 minims.

PULSE RATE (Average).

Fœtus	150-130 per minute.
New-born infant	140-130 per minute.
Under 1 year	130-115 per minute.
Under 2 years	115-100 per minute.
2-7 years	100- 90 per minute.
14-21 years	85- 75 per minute.
21-65 years	75- 65 per minute.
In old age	85- 70 per minute.

In health the pulse rate varies not only with the age, but is affected by such conditions as sex, temperament, excitement, food and temperature.

ADMINISTRATION OF UNUSUAL FRACTIONAL DOSES OF A DRUG.

Dr. M. S. Aaronson, of New York, has devised a rule whereby one may readily administer any fractional dose of a drug, starting out with one of the standard tablets of known strength. Thus, if one has a tablet

of morphine containing one-eighth of a grain, and if it is desired to administer one-sixty-sixth of a grain of this drug, the procedure is as follows: Take sixty-six minims of water and in this dissolve the tablet. Eight minims of this solution contains the required dose. This rule is applicable in the administration of any fractional dose, whether or not the denominator of the fraction is a multiple of the denominator of the fraction represented in the tablet.

DENTITION TABLE (Average).

Milk Teeth.—Dentition usually begins at the sixth or seventh month and should be completed by the second year.

Central incisors, lower, 6th month; upper, 7th month.

Lateral incisors, upper, 9th month; lower, 10th month.

First molars, 12th month.

Second molars, 2nd year (may be later).

Permanent Teeth.—

First molars	6½ years.
Lower central incisors	7 years.
Upper central incisors	8 years.
Lateral incisors	9 years.
First bicuspid	10 years.
Second bicuspid	11 years.
Canines	12 years.
Second molars	13 years.
Third molars (wisdom)	17-25 years. (or later.)

TABLE SHOWING THE DEATH-RATE PER 1,000 OF EACH SEX IN EACH OF THE THREE CONDITIONS OF LIFE.

AGES.	MALES.			FEMALES.		
	Unmarried.	*Married.*	*Widowers.*	*Unmarried.*	*Married.*	*Widows.*
20-25	12.88	8.92	49.60	8.32	9.92	12.31
25-30	10.17	6.24	21.84	9.02	8.98	23.62
30-35	11.51	6.82	19.17	9.87	9.36	16.90
35-40	13.15	7.52	17.50	10.87	9.29	15.03
40-45	16.62	9.55	18.89	13.28	10.14	12.73
45-50	19.60	11.47	22.20	15.71	10.69	13.30
50-55	25.80	15.61	26.80	20.97	14.11	15.20
55-60	32.10	21.50	34.17	26.90	19.29	24.47
60-65	45.92	32.60	47.50	40.52	30.75	37.07
65-70	58.50	44.80	62.97	58.30	45.30	53.50

BIRTH, MARRIAGE, AND DEATH STATISTICS.

The following interesting table gives a comparative view of the fertility of marriages, the legitimacy and illegitimacy of births, and the mortality in city and country in the various European States:

COUNTRIES.	CHILDREN TO ONE MARRIAGE.		INFANT MORTALITY.		ADULT MORTALITY.		FERTILITY OF MARRIAGE.		ILLEGITIMATE TO LEGITIMATE BIRHTS.	
	City.	*Country.*	*City.*	*Country.*	*City.*	*Country.*	*City.*	*Country*	*City.*	*Country.*
France.....	3.16	3.28	*35.69	*28.56	1:21.51	1:42.21	2.03	2.34	*15.13	*4.24
Netherlands..	3.91	4.32	36.25	28.90	1:35.55	1:43.03	2.49	3.07	7.7	2.84
Belgium	3.80	4.17			1:34.35	1:44.31			14.59	5.88
Sweden.....	2.99	4.19	38.86	24.50	1:28.95	1:46.86	1.83	3.16	27.44	7.50
Denmark....	3.04	3.34	29.66	22.68	1:37.41	1:49.77	2.14	2.58	16.45	10.06
Schleswig...	3.50	3.69	27.42	23.42	1:35.17	1:48.49	2.54	2.83	8.38	6.37
Holstein....	3.37	3.88	29.92	25.29	1:38.73	1:44.15	2.36	2.90	15.50	8.74
Saxony.....	4.60	4.13	39.88	36.22	1:31.10	1:34.70	2.77	2.64	15.39	14.64
Hanover....	2.93	3.65	28.70	26.47	1:38.52	1:41.17	2.08	2.68	17.42	9.06
Prussia.....	4.00	4.44	36.02	29.47	1:27.97	1:34.46	2.56	3.13	9.80	6.60

* Per cent.

AVERAGE LENGTH OF LIFE IN VARIOUS OCCUPATIONS.

The Report of Registration of the State of Massachusetts shows that the average length of life of the various trades and professions has been as follows:

Occupations.	*Years.*	*Occupations.*	*Years.*
Farmers	65.19	Weavers	44.65
Millers	57.43	Artists	44.56
Sawyers	56.67	Shoemakers	44.45
Physicians	55.08	Brushmakers	43.40
Hatters	54.55	Furnace Men	43.05
Clock and Watchmakers	54.43	Founders	42.73
Carpenters and Joiners	53.31	Shoecutters	42.62
Blacksmiths	53.31	Pianofortemakers	42.50
Sailmakers	52.84	Glasscutters	42.39
Woodturners	52.55	Civil Engineers	42.34
Combmakers	51.38	Cigarmakers	41.59
Masons	50.48	Engineers	41.57
Butchers	50.29	Musicians	41.19
Tanners	50.05	Tinsmiths	40.96
Cabinetmakers	48.65	Expressmen	40.94
Gunsmiths	48.57	Nailmakers	40.80
Carriagemakers	48.38	Machinists	40.80
Harnessmakers	48.36	Jewelers	40.29
Brickmakers	47.99	Servants (women)	40.19
Woolsorters	47.55	Teamsters	40.13
Leatherdressers	47.41	Bookbinders	39.94
Laborers	47.39	Upholsterers	39.78
Musical Instrument Makers	47.32	Barbers	39.77
Tailors	47.19	Pail and Tubmakers	39.50
Architects	47.15	Cutlers	39.23
Bakers	46.76	Operatives	38.92
Dressmakers (women)	46.49	Printers	38.57
Seamen	46.33	Engineers and Firemen	38.21
Stonecutters	46.30	Drivers	38.16
Coppersmiths	46.07	Milliners	37.30
Silver and Goldsmiths	45.46	Glassblowers	37.81
Dyers	45.35	Plumbers	35.43
Mechanics	45.13	Carvers	33.84
Painters	45.05	Operatives (women)	27.98

AVERAGE WEIGHT AND STATURE OF MAN.

Males.			Females.		
Age.	*Feet.*	*Pounds.*	*Age.*	*Feet.*	*Pounds.*
0 years	1.64	7.06	0 years	1.62	6.42
2 years	2.60	25.01	2 years	2.56	23.53
4 years	3.04	31.38	4 years	3.00	28.67
6 years	3.44	38.80	6 years	3.38	35.29
9 years	4.00	49.95	9 years	3.92	47.10
11 years	4.36	49.77	11 years	4.26	56.57
13 years	4.72	75.81	13 years	4.60	72.65
15 years	5.07	96.40	15 years	4.92	89.04
17 years	5.36	116.56	17 years	5.10	104.34
18 years	5.44	127.59	18 years	5.13	112.55
20 years	5.49	132.46	20 years	5.16	115.30
30 years	5.52	140.38	30 years	5.18	119.82
40 years	5.52	140.42	40 years	5.18	121.81
50 years	5.49	139.96	50 years	5.04	123.86
60 years	5.38	136.07	60 years	4.97	119.76
70 years	5.32	131.27	70 years	4.97	113.60
80 years	5.29	127.54	80 years	4.94	108.80
90 years	5.29	127.54	90 years	4.94	108.81

COMPOSITION OF THE HUMAN BODY.

Elements.	*Pounds.*	*Ounces.*	*Grains.*
1. Water, which is found in every part of the body, and amounts to	109	0	0
2. Fibrine, and like substances, found in the blood, and form the chief solid materials of the flesh	15	10	0
3. Phosphate of lime, chiefly in bones and teeth, but in all liquids and tissues	8	12	0
4. Fat, a mixture of three chemical compounds, and distributed all through the body	4	8	0
5. Osseine, the organic framework of bones; boiled, gives gelatine. Weighs	4	7	350
6. Keratine, a nitrogenous substance, forming the greater part of hair, nails and skin. Weighs	4	2	0
7. Cartilagine resembles the osseine or bone, and is a nitrogenous substance, the chief constituent of cartilage, weighing	1	8	0
8. Hemoglobine gives the red color to the blood, and is a nitrogenous substance containing iron, and weighing	1	8	0
9. Albumen is a soluble nitrogenous substance found in the blood, chyle, lymph and muscle, and weighs	1	1	0
10. Carbonate of lime is found in the bones chiefly, and weighs	1	1	0
11. Kephalin is found in nerves and brain, with cerebrine and other compounds	0	13	0
12. Fluoride of calcium is found in teeth and bones, and weighs	0	7	175
13. Phosphate of magnesia is also in teeth and bones, and weighs	0	7	0
14. Chloride of sodium, or common salt, is found in all parts of the body, and weighs	0	7	0
15. Cholesterin, glycogen and inosite are compounds containing hydrogen, oxygen and carbon, found in muscle, liver and brain and weighing	0	3	0
16. Sulphate, phosphate and salts of sodium, found in all tissues and liquids	0	2	107
17. Sulphate, phosphates and chloride of potassium are also in all tissues and liquids	0	0	300
18. Silica, found in hair, skin and bone	0	0	30
	154	0	0

EXPECTATION OF LIFE AT VARIOUS AGES.

Age.	*Male.*	*Fem.*	*Age.*	*Male,*	*Fem.*	*Age.*	*Male.*	*Fem.*	*Age.*	*Male.*	*Fem.*
0 year	39.91	41.85	25 years	36.12	37.04	50 years	19.54	20.75	75 years	6.49	6.93
1 year	46.65	47.31	26 years	35.44	36.39	51 years	18.90	20.09	76 years	6.15	6.56
2 years	48.83	49.40	27 years	34.77	35.75	52 years	18.28	19.42	77 years	5.82	6.21
3 years	49.61	50.20	28 years	34.10	35.10	53 years	17.67	18.75	78 years	5.51	5.88
4 years	49.81	50.43	29 years	33.43	34.46	54 years	17.06	18.08	79 years	5.21	5.56
5 years	49.71	50.33	30 years	32.76	33.81	55 years	16.45	17.43	80 years	4.93	5.26
6 years	49.39	50.00	31 years	32.09	33.17	56 years	15.86	16.79	81 years	4.66	4.98
7 years	48.92	49.53	32 years	31.42	32.53	57 years	15.26	16.17	82 years	4.41	4.71
8 years	48.37	48.98	33 years	30.74	31.88	58 years	14.68	15.55	83 years	4.17	4.45
9 years	47.74	48.35	34 years	30.07	31.23	59 years	14.10	14.94	84 years	3.95	4.21
10 years	47.05	47.67	35 years	29.40	30.59	60 years	13.53	14.34	85 years	3.73	3.98
11 years	46.31	46.95	36 years	28.73	29.94	61 years	12.96	13.75	86 years	3.53	3.76
12 years	45.54	46.20	37 years	28.06	29.29	62 years	12.41	13.17	87 years	3.34	3.56
13 years	44.76	45.44	38 years	27.39	28.64	63 years	11.87	12.60	88 years	3.16	3.36
14 years	43.97	44.68	39 years	26.72	27.99	64 years	11.34	12.05	89 years	3.00	3.18
15 years	43.18	43.90	40 years	26.06	27.34	65 years	10.82	11.51	90 years	2.84	3.01
16 years	42.40	43.14	41 years	25.39	26.69	66 years	10.32	10.98	91 years	2.69	2.85
17 years	41.64	42.40	42 years	24.73	26.03	67 years	9.83	10.47	92 years	2.55	2.70
18 years	40.90	41.67	43 years	24.07	25.38	68 years	9.36	9.97	93 years	2.41	2.55
19 years	40.17	40.97	44 years	23.41	24.72	69 years	8.90	9.48	94 years	2.29	2.42
20 years	39.48	40.29	45 years	22.76	24.06	70 years	8.45	9.02	95 years	2.17	2.29
21 years	38.80	39.63	46 years	22.11	23.40	71 years	8.03	8.57	96 years	2.06	2.17
22 years	38.13	38.98	47 years	21.46	22.74	72 years	7.62	8.13	97 years	1.95	2.06
23 years	37.46	38.33	48 years	20.82	22.08	73 years	7.22	7.71	98 years	1.85	1.96
24 years	36.79	37.68	49 years	20.17	21.42	74 years	6.85	7.31	99 years	1.76	1.86
									100 years	1.68	1.76

PART IV OF BOOK IX

Gives more than one hundred standard medical prescriptions and simple formulas for many diseases.

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Home Administration of Medicine

PART IV.

MEDICAL PRESCRIPTIONS

The following prescriptions are prepared and used by B. F. Scholl, M.D., Ph.G., Philadelphia, Pa. The doses are for adults except where otherwise mentioned. See footnote.

ABSCESSES (BOILS).

LATIN.	ENGLISH.
Sulph. calcis ..... 2 grains Sacch. lactis ..... 20 grains Mft. Cht. No. XX. One powder every hour or two. For children, two or three times a day.	Sulphide of lime ..... 2 grains Sugar of milk ..... 20 grains Make 20 powders. Take one powder every hour or two. For children, two or three times a day.

ASTHMA.

Ammonia bromid ..... 3 drachms Ammonia chlorid ..... 1½ drachms Lobelia tinct ..... 3 drachms Spts. aeth. comp ..... 1 ounce Syrp. acacia ..... 2½ ounces Mft. Take a teaspoonful every hour during paroxysm.	Bromide of ammonia .... 3 drachms Chloride of ammonia .... 1½ drachms Tincture of lobelia ..... 3 drachms Com. spirits of ether .... 1 ounce Syrup of gum arabic .... 2½ ounces Take a teaspoonful every hour during paroxysm.

BILIOUSNESS.

Podophyllin ..... 6 grains Aloin ..... 6 grains Ex. nucis vomicæ ..... 6 grains Ex. belladonna ..... 3 grains Mft. Div. in pil. No. XXIV. Sig.—Take one or two pills at night, followed in morning by a dose of Rochelle salts.	Podophyllin ..... 6 grains Aloin ..... 6 grains Ex. nux vomica ..... 6 grains Ex. belladonna ..... 3 grains Divide into 24 pills. Take one or two pills at night, followed in morning by dose of Rochelle salts.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

BRONCHITIS (ACUTE).

LATIN.	ENGLISH.
Liq. ammon. acetatis ..... 1 ounce	Liq. acetate of ammonia... 1 ounce
Syrp. ipecac ..... 2 drachms	Syrup of ipecac ..... 2 drachms
Syrp. pruni virg. ..... 1 ounce	Syrup of wild cherry.... 1 ounce
Syrp. acacia ..... 2 ounces	Syrup of gum arabic ..... 2 ounces
Aqua dest ..... 3 ounces	Water ..... 3 ounces
Dose: Tablespoonful every two or three hours.	Dose: Tablespoonful every two or three hours.

BRONCHITIS.

Ammon. chlor ..... 1½ drachms	Chloride of ammonia .... 1½ drachms
Ammon. carb ..... 8 grains	Carbonate of ammonia .. 8 grains
Mist. Glycyrrh Co ..... 4 ounces	Brown Mixture ..... 4 ounces
Sig: Two teaspoonfuls every 3 or 4 hours.	Two teaspoonfuls every 3 or 4 hours.

BUNIONS.

Iodine tinct. ..... 2 drachms	Tincture of iodine ..... 2 drachms
Belladonna tinct. ..... 2 drachms	Tincture of belladonna ..... 2 drachms
Mft. Apply twice a day with camel's-hair brush.	Apply twice a day with camel's-hair brush.

BURNS AND SCALDS.

Soda bicarb. ..... 2 ounces	Bicarbonate of soda ..... 2 ounces
Aqua dest. ..... 1 pint	Water ..... 1 pint
Mft. Apply if skin is not broken.	Apply if skin is not broken.
Acid carbolic ..... 8 grains	Carbolic acid ..... 8 grains
Vaseline ..... 2 ounces	Vaseline ..... 2 ounces
Mft. Apply on lint where skin is broken.	Apply on lint where skin is broken.
Aqua calcis ..... 4 ounces	Limewater ..... 4 ounces
Ol. lini ..... 4 ounces	Linseed oil ..... 4 ounces
Locally.	Locally.

CARBUNCLE.

Resorcin ..... 2 drachms	Resorcin ..... 2 drachms
Lanoline ..... 1 ounce	Lanoline ..... 1 ounce
Mft. Apply on lint.	Apply on lint.

CATARRH.

Liquor antisepticus alk. ..... 6 ounces	Alkaline antiseptic solution.... 6 ounces
Sig: Use freely in an atomizer to the nose and throat.	Use freely in an atomizer to the nose and throat.

CATARRH (NASAL).

Acid carbolic liq. .....30 minims	Liq. carbolic acid ..... 30 minims
Soda bicarb. ..... 1 drachm	Bicarbonate of soda ..... 1 drachm
Soda biboras ..... 1 drachm	Borax ..... 1 drachm
Glycerina ..... ½ ounce	Glycerine ..... ½ ounce
Aq. rosæ ..... 3½ ounces	Rose water ..... 3½ ounces
Mft. To be used with atomizer four or five times a day.	To be used with atomizer four or five times a day.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

CATARRH (FAUCIAL).

LATIN.

Soda salicylate ..... 2 drachms
Soda biboras ..... 3 drachms
Glycerina ..... 4 drachms
Aq. rosæ ..... 5½ ounces
Mft. A dessertspoonful in one pint of water and used with atomizer to throat.

ENGLISH.

Salicylate of soda ..... 2 drachms
Borax ..... 3 drachms
Glycerine ..... 4 drachms
Rose water ..... 5½ ounces
A dessertspoonful in a pint of water and used with atomizer to throat.

CHILBLAINS.

Camphor .....75 grains
Alcoholis ..... 3 drachms
Glycerina ..... 5 drachms
Mft. Apply several times daily.

Camphor .....75 grains
Alcohol ..... 3 drachms
Glycerine ..... 5 drachms
Apply several times daily.

CHOLERA (SUN).

Tinct. opii ..... 1 ounce
Tinct. capsici ..... 1 ounce
Tinct. rhei. aromat..... 1 ounce
Aq. menth. pip..... 1 ounce
Camphora spts. ..... 1 ounce
Sig.—Take 20 to 40 drops in water every two or three hours.

Laudanum ..... 1 ounce
Tinc. of cayenne pepper ..... 1 ounce
Tinc. of rhubarb aromatic .... 1 ounce
Peppermint water ..... 1 ounce
Spirits of camphor ..... 1 ounce
Take 20 to 40 drops in water every two or three hours.

CHOLERA INFANTUM.

Ex. belladonna fld. .....50 drops
Tinct. opii camph. ..... 1½ drachms
Soda sulphate .....15 grains
Syrp. limonis ..... 2 ounces
Sig.—A teaspoonful every two or three hours to a child one year old. Increase or lessen with age.

Fld. extract of belladonna, 50 drops
Paregoric ..... 1½ drachms
Sulphate of soda .....15 grains
Syrup of lemons ..... 5 ounces
A teaspoonful every two or three hours for a child one year old. Increase or lessen with age.

Bismuth subnit. .....32 grains
Tr. card. co. .....½ drachm
Glycerine ..... 1 drachm
Aqua mentha vir ad..... 2 ounces
Teaspoonful every 2 or 3 hours.

Subnitrate of bismuth .....32 grains
Comp. tinct. of cardamon....½ drachm
Glycerine ..... 1 drachm
Spearmint water to make.... 2 ounces
Teaspoonful every 2 or 3 hours.

CHOLERA MORBUS.

Spts. chloroformi .....30 minims
Heroin .....⅛ grain
Camphora spts. .....20 minims
Aq. menth. pip..... 1 ounce
Sig.—A teaspoonful every hour.

Chloroform .....30 minims
Heroin .....⅛ grain
Spirits of camphor .....20 minims
Peppermint water ..... 1 ounce
A teaspoonful every hour.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

COLIC (INFANTILE).

LATIN.

Assafetida tinct. .....15 drops
Cinnamoni tinct. .....30 drops
Syrp. rhei. aromat. ..... 3 drachms
Soda bicarb. .....20 grains
Aq. dest. ..... 1½ ounces
Sig.—Half a teaspoonful every two or three hours.

ENGLISH.

Tincture of assafetida....15 drops
Tincture of cinnamon ....30 drops
Syr. rhubarb aromatic .... 3 drachms
Soda bicarbonate .....20 grains
Water ..... 1½ ounces
Half a teaspoonful every two or three hours.

CONVULSIONS (INFANTILE).

Ammonia bromid ..... 40 grains
Potass. bromid ..... 30 grains
Ex. gelsemium fld. ..... 20 drops
Ex. valerian fld. ..... 20 drops
Aq. dest. ..... 1 ounce
Sig.—Half a teaspoonful for a child every two or three hours.

Bromide of ammonia ..... 40 grains
Bromide of potash ..... 30 grains
Fluid ext. of gelsemium .... 20 drops
Fluid ext. of valerian ..... 20 drops
Water ..... 1 ounce
Half a teaspoonful for a child every two or three hours.

CONSTIPATION

Aloin ..... 2 grains
Ext. Bella. ..... 2 grains
Ext. nucis vom. ..... 4 grains
Ext. cascara sagrada ..... 16 grains
Div. in pil. No. XVI. Sig.—One at night.

Aloin ..... 2 grains
Extract of belladonna ..... 2 grains
Extract of nux vomica ..... 4 grains
Extract cascara ..... 16 grains
Make 16 pills. Take one at night.

Aloes soc. ..... 20 grains
Gambogue ..... 10 grains
Saponis ..... 5 grains
Podophyllin ..... 2½ grains
Leptandrin ..... 1½ grains
Ol. capsici ..... 1 drop
Mft. Div. in pil. No. XII. Sig.—Take one three times a day.

Aloes ..... 20 grains
Gamboge ..... 10 grains
White soap ..... 5 grains
May-apple ..... 2½ grains
Leptandrin ..... 1½ grains
Oil capsicum ..... 1 drop
Make 12 pills, and take one three times a day.

CROUP (SIMPLE).

Give teaspoonful of syr. ipecac as an emetic, then—
Vin antim ..... 2 drachms
Syrp. papaveris ..... ½ ounce
Syrp. tolu ..... 2 drachms
Aq. dest. ..... 1 ounce
Sig.—A teaspoonful every hour or two for a child one year old. Increase or lessen with age.

Give teaspoonful of syr. ipecac as an emetic, then—
Wine of antimony ..... 2 drachms
Syrup of poppies ..... ½ ounce
Syrup of tolu ..... 2 drachms
Water ..... 1 ounce
Teaspoonful every hour or two for a child one year old. Increase or lessen with age.

DIARRHŒA (ACUTE).

Tinct. opii deod ..... 15 drops
Bismuth subnit. ..... 2 drachms
Syrp. simplex ..... ½ ounce
Mist. cretæ ..... 1½ ounces
Sig.—A teaspoonful every two or three hours to a child one year old.

Tinc. opium, deodorized.. 15 drops
Subnitrate of bismuth ... 2 drachms
Simple syrup ..... ½ ounce
Chalk mixture ..... 1½ ounces
A teaspoonful every two or three hours to a child one year old.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

DIARRHŒA (CHRONIC).

LATIN.	ENGLISH.
Ex. ergot ..... 20 grains	Aqueous ext. of ergot..... 20 grains
Ex. nucis vom. ..... 5 grains	Extract of nux vomica ..... 5 grains
Ex. opii ..... 10 grains	Extract of opium ..... 10 grains
Mft. Div. in pil. No. XX. Sig.—One pill every three or four hours.	Make 20 pills. Take one pill every three or four hours.

DIPHTHERIA.

Call physician and give antitoxin early in the case. This will also apply to membranous croup.

Potash chlor. ..... 20 grains	Chlorate of potash ..... 20 grains
Tinct. ferri chlor. ..... 2 drachms	Tinc. chloride of iron.... 2 drachms
Glycerina ..... 1 ounce	Glycerine ..... 1 ounce
Aq. rosæ ..... 1½ ounces	Rose water ..... 1½ ounces
Sig.—Apply to throat every hour.	Apply to throat every hour.

DYSENTERY (ACUTE).

Cupri sulph. ..... ½ grain	Sulphate of copper ..... ½ grain
Magnesia sulph. ..... 1 ounce	Epsom salts ..... 1 ounce
Acid sulph. dil. ..... 1 drachm	Sulphuric acid, diluted ..... 1 drachm
Aq. dest. ..... 4 ounces	Water ..... 4 ounces
Sig.—A teaspoonful every hour or two.	A teaspoonful every hour or two.

DYSENTERY (CHRONIC).

Vin ipecac ..... 1 ounce	Wine of ipecac ..... 1 ounce
Sig.—One drop every hour when stools are slimy.	One drop every hour when stools are slimy.

DYSPEPSIA (FLATULENT).

Bismuth subnit ..... 1 drachm	Subnitrate of bismuth ..... 1 drachm
Magnesia ..... ½ drachm	Magnesia ..... ½ drachm
Pv. belladonna ..... 1 grain	Powdered belladonna ..... 1 grain
Pv. zingiber ..... 3 grains	Powdered ginger ..... 3 grains
Mft. Cht. No. X. Sig.—One every three hours in aq. menth, pip.	Make 10 powders. Take one every three hours in peppermint water.

DYSPEPSIA (GASTRIC).

Soda sulph. gran. ..... 1 ounce	Sulphate of soda, gran..... 1 ounce
Soda bicarb. ..... 1 ounce	Bicarbonate of soda ..... 1 ounce
Pv. cinchona ..... 1 ounce	Powdered chinchona ..... 1 ounce
Sig.—A teaspoonful in half a glass of water before and after meals.	A teaspoonful in half glass of water before and after meals.

DYSPEPSIA (NERVOUS).

Bismuth sub. carb. ..... 3 drachms	Subcarbonate bismuth ..... 3 drachms
Pulv. aromatic ..... 1 drachm	Aromatic powder ..... 1 drachm
Mft. Cht. No. XII. Sig.—One before each meal.	Make 12 powders. Take one before each meal.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

EARACHE.

LATIN.

Atropia sulph. ..... 1½ grains
Heroin ..... ⅛ grain
Glycerina ..... 1 ounce
Mft. Place one or two drops in ear on absorbent cotton two or three times a **day.**

ENGLISH.

Sulphate of atropia ..... 1½ grains
Heroin ..... ⅛ grain
Glycerine ..... 1 ounce
Place one or two drops in ear on absorbent cotton two or three times a day.

ERYSIPELAS.

Ichthyol ..... ½ ounce
Ether sulph. ..... 2 drachms
Glycerina ..... 2 drachms
Mft. Apply locally.

Ichthyol ..... ½ ounce
Ether ..... 2 drachms
Glycerine ..... 2 drachms
Apply locally.

FLATULENCE.

Pulv. columbæ ..... ½ ounce
Pulv. zingiber ..... ½ ounce
Aq. bulliens ..... 1 pint
Senna fol. ..... 1 drachm
Mft. infusion. Sig.—Take a wineglassful three times a day.

Powdered columbæ ..... ½ ounce
Powdered ginger ..... ½ ounce
Hot water ..... 1 pint
Senna leaves ..... 1 drachm
Make an infusion. Take a wineglassful three times a day.

HAY FEVER.

Adrenalin or adnephrin 1 to 3,000 to be used in an atomizer to the nose 3 to 6 times a day.

Adrenalin inhalant or anesthoric cream applied to the nostril.

HEADACHE (BILIOUS).

Ammonia brom. ..... 3 drachms
Caffeine cit. ..... 30 grains
Spts. ammon. aromat..... 1 drachm
Elix. guarana ..... 4 ounces
Aq. rosæ ..... 4 ounces
Sig.—A teaspoonful every half hour until relieved.

Bromide of ammonia ..... 3 drachms
Citrate of caffeine ..... 30 grains
Aromatic spts. of ammonia 1 drachm
Elixir guarana ..... 4 ounces
Rose water ..... 4 ounces
A teaspoonful every half hour until relieved.

HEADACHE (NERVOUS).

Strontium Bromide ..... 2½ drachms
Tr. nucis vom. ..... 1 drachm
Tr. card. co. ..... 6 drachms
Syrupus ..... 1 ounce
Aqua ad. ..... 4 ounces

Zinci phosphide ..... 3 grains
Ex. nucis vom. ..... 10 grains
Confec. rosæ ..... q. s.
Mft. Div. in pil. No. XXX. Sig.—One after each meal.

Bromide of strontium .... 2½ drachms
Tinct. of nux vomica..... 1 drachm
Comp. tinct. of card..... 6 drachms
Syrup ..... 1 ounce
Water to make ..... 4 ounces

Phosphide of zinc ..... 3 grains
Ext. of nux vomica ..... 10 grains
Confection of roses...Sufficient quantity
Make 30 pills. Take one after each meal.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

HEART-BURN.

LATIN.		ENGLISH.	
Soda bicarb	1 drachm	Bicarbonate of soda	1 drachm
Pulv. rhei.	½ ounce	Powdered rhubarb	½ ounce
Spts. menth. pip.	2 drachms	Spirits of peppermint	2 drachms
Aq. dest.	4 ounces	Water	4 ounces
Sig.—A tablespoonful after meals.		A tablespoonful after meals.	

HICCOUGH.

Zinci valer.	8 grains	Valerianate of zinc	8 grains
Ex. belladonna	3 grains	Ext. of belladonna	3 grains
Mft. Div. in pil. No. XII. Sig.—Give one every three or four hours as required.		Make 12 pills. Give one every three or four hours as required.	

INFLAMMATION OF BREAST.

Ung. belladonna	1 ounce	Ointment of belladonna	1 ounce
Pulv. camphora	1 drachm	Powdered camphor	1 drachm
Mft. and apply to breast.		Mix together and apply to breast.	

INFLUENZA (LA GRIPPE).

Quinia sulph.	32 grains	Quinine	32 grains
Phenacetin	32 grains	Phenacetin	32 grains
Caffeine	8 grains	Caffeine	8 grains
Aloin	2 grains	Aloin	2 grains
Mft. cap. No. XVI, div. Sig.—One every three or four hours.		Make 16 capsules and take one every three or four hours.	

Potass. bromid.	1 drachm	Bromide of potash	1 drachm
Ammon. chlorid.	50 grains	Chloride of ammonia	50 grains
Syrp. scillæ	2 drachms	Syrup of squills	2 drachms
Mist. glycyrrhiza comp...	2½ ounces	Brown mixture	2½ ounces
Sig.—Take a teaspoonful every two hours.		Take a teaspoonful every two hours.	

JAUNDICE.

Hydrg. chlor. mite	6 grains	Calomel	6 grains
Pulv. rhei.	3 grains	Powdered rhubarb	3 grains
Podophyllin	¼ grain	Powdered May-apple	¼ grain
Soda bicarb.	8 grains	Bicarbonate of soda	8 grains
Mft. Cht. No. VI. Sig.—One every two or three hours.		Make 6 powders. Take one every two or three hours.	

KIDNEYS (INFLAMMATION OF).

Flor. scoparius tinct.	7½ drachms	Tinct. flowers of broom..	7½ drachms
Tinct. juniperi	2½ drachms	Juniper	2½ drachms
Aq. bulliens	2 pints	Hot water	2 pints
Mft. an infusion. Sig.—Take a wineglassful four times a day.		Make an infusion. Take wineglassful four times a day.	

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

LUMBAGO.

LATIN.

Phenacetin ..... 24 grains
Salol ..... 24 grains
Caffeine ..... 6 grains
Mft. pil. No. XII. Div. Sig.—One every three or four hours.

Potass. iodid ..... 2 drachms
Vin colch. sem ..... 1 ounce
Syrp. sarsaparilla comp..... 1 ounce
Aq. dest. ..... 1 ounce
Sig.—A teaspoonful in water every three hours.

Tinct. iodine ..... 2 drachms
Tinct. aconit root ..... 3 drachms
Spts. chloroformi ..... 4 drachms
Tinct. sapo. camph..... 9 drachms
Locally.

ENGLISH.

Phenacetin ..... 24 grains
Salol ..... 24 grains
Caffeine ..... 6 grains
Make 12 pills. One every three or four hours.

Iodide of potash ..... 2 drachms
Wine of colchicum seed .... 1 ounce
Com. syr. of sarsaparilla.... 1 ounce
Water ..... 1 ounce
A teaspoonful in water every three hours.

Tincture of iodine ..... 2 drachms
Tincture of aconite root ... 3 drachms
Chloroform ..... 4 drachms
Soap liniment ..... 9 drachms
Locally.

MARASMUS.

Ol. morrhuæ ..... 2 ounces
Aq. calcis ..... 4 drachms
Syrp. calcis lactophos .... 1½ ounces
Sig.—A teaspoonful three times a day for a child one year old. Increase or lessen with age.

Cod-liver oil ..... 2 ounces
Limewater ..... 4 drachms
Syr. lactophosphate of lime 1½ ounces
A teaspoonful three times a day for a child one year old. Increase or lessen with age.

MALARIA.

Strych. sulph. ..... ½ grain
Acid arsenious ..... ¾ grain
Ferri pulv. ..... 15 grains
Quinia sulph. ..... 15 grains
Aloes soc. ..... 3 grains
Mft. Div. in pil. No. XX. Sig.—Take one pill every three hours.

Strychnine ..... ½ grain
Arsenious acid ..... ¾ grain
Iron by hydrogen ..... 15 grains
Quinine ..... 15 grains
Aloes ..... 3 grains
Make 20 pills. Take one pill every ree hours.

MEASLES.

(For fever.)
Tr. aconite rad. ..... 12 drops
Liq. ammon. acet. ..... ½ ounce
Liq. Potass. Cit. ..... 1½ ounces
Syrupus ..... 1 ounce
Sig.—Teaspoonful every two or three hours for a child 2 to 6 years of age.

Acetanilid ..... 10 grains
Quinia sulph. ..... 20 grains
Soda salicylate ..... 10 grains
Mft.. mass and div. in cht. No. XV.
Sig.—One every four hours.

Tinct. of aconite root ..... 12 drops
Spirits of minderus ..... ½ ounce
Sol. citrate of potash ..... 1½ ounces
Syrup ..... 1 ounce
Take a teaspoonful every two or three hours for a child 2 to 6 years of age.

Acetanilid ..... 10 grains
Quinine ..... 20 grains
Salicylate of soda ..... 10 grains
Make 15 powders. Take one every four hours.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

MUMPS.

LATIN.

Oleum camphorata ..... 2 ounces
Sig.—Bathe over the swelling.

Quinia sulph. ..... 10 grains
Potass. chlor. ..... 25 grains
Tinct. aconite rad. ..... 10 drops
Spts. nit. dulc..... 2½ drachms
Syrp. simplex ..... 14 drachms
Sig.—A teaspoonful every three hours for a child ten years old. Increase or decrease according to age.

ENGLISH.

Camphorated oil ..... 2 ounces
Bathe over the swelling.

Quinine ..... 10 grains
Chlorate of potash ..... 25 grains
Tincture of aconite ..... 10 drops
Sweet spirits of nitre ... 2½ drachms
Simple syrup ..... 14 drachms
A teaspoonful every three hours for a child ten years old. Increase or lessen according to age.

NEURALGIA.

Quin. sulph. ..... 1 drachm
Codeine ..... ⅛ grain
Acid arsenious ..... 1½ grains
Aconit ex. ..... 15 grains
Strych. sulph. ..... 1 grain
Mft., mass and div. in pil. No. XXX.
Sig.—Take one three or four times a day.

Sulphate of quinine .... 1 drachm
Codeine ..... ⅛ grain
Arsenious acid ..... 1½ grains
Extract of aconite ..... 15 grains
Sulphate of strychnine .. 1 grain
Make 30 pills. Take one three or four times a day.

PLEURISY.

Phenacetin ..... 24 grains
Quinia sulph. ..... 24 grains
Caffeine ..... 6 grains
Mft. cap. No. XII, div. Sig.—One every three hours.

Heroin ..... ⅛ grain
Acetate potass. ..... ½ ounce
Tinct. verat. viride ..... 25 minims
Syrp. tolu ..... ½ ounce
Liq. potass. citratis ..... 2½ ounces
Sig.—A teaspoonful every two hours.

Phenacetin ..... 24 grains
Quinine ..... 24 grains
Caffeine ..... 6 grains
Make 12 capsules and give one every three hours.

Heroin ..... ⅛ grain
Acetate of potash ..... ½ ounce
Tinc. verat. viride ..... 25 minims
Syrup of tolu ..... ½ ounce
Liquor citrate of potash.. 2½ ounces
A teaspoonful every two hours.

PNEUMONIA.

Potass. iodid ..... 1 drachm
Ammonia mur ..... 1½ drachms
Mist. glycyrrhiza comp.... 6 ounces
Sig.—A tablespoonful every three hours.

Iodide of potash ..... 1 drachm
Muriate of ammonia ..... 1½ drachms
Brown mixture ..... 6 ounces
A teaspoonful every two hours.

PRICKLY HEAT.

Soda biboras ..... 6 drachms
Spts. camphora ..... 6 grains
Aq. rosæ ..... 6 ounces
Mft. Bathe the parts, and between applications dust on pulv. lycopodium.

Borax powder ..... 6 drachms
Spirits of camphor ..... 6 grains
Rose water ..... 6 ounces
Bathe the parts, and between applications dust on lycopodium powder.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

RHEUMATISM (ACUTE).

LATIN.

Acid salicylic ..... 2½ drachms
Sodii bicarb. ..... 2 drachms
Vin. colch. sem. ..... 6 drachms
Syrupus ..... 1 ounce
Aqua mentha pip. ad.... 2 ounces
Sig.—Dessertspoonful every three or four hours.

Sodii salicylate ..... 2½ drachms
Vin. colch. rad..... 3 drachms
Tr. card. co. ..... 6 drachms
Syrupus ..... 1 ounce
Aqua ..... 2 ounces
Sig.—Two teaspoonfuls every four hours.

ENGLISH.

Salicylic acid ..... 2½ drachms
Baking soda ..... 2 drachms
Wine of colchicum seed... 6 drachms
Syrup ..... 1 ounce
Peppermint water ..... 2 ounces
Dessertspoonful every three or four hours.

Salicylate of soda ..... 2½ drachms
Wine of colchicum root .. 3 drachms
Comp. tinct. of cardamon.. 6 drachms
Syrup ..... 1 ounce
Water ..... 2 ounces
Two teaspoonfuls every four hours.

RHEUMATISM (CHRONIC).

Potass. bicarb. ..... 2 drachms
Acid salicylic ..... 2 drachms
Potass. iodid ..... 2 drachms
Tinct. colch. sem ..... 3 drachms
Syrp. aurant. cort..... 3 ounces
Sig.—A dessertspoonful every three hours.

Bicarbonate of potash ..... 2 drachms
Salicylic acid ..... 2 drachms
Iodide of potash ..... 2 drachms
Tinc. of colchicum seed.... 3 drachms
Syr. of orange peel ..... 3 ounces
A dessertspoonful every three hours.

RHEUMATISM (MUSCULAR).

Ammon. chlorid ..... ½ ounce
Ex. cimicifuga fld. ..... 2 ounces
Syrp. acacia ..... 1 ounce
Aq. lauro-cerasi ..... 1 ounce
Sig.—A teaspoonful four times a day.

Chloride of ammonia ..... ½ ounce
Ext. of blacksnake root ..... 2 ounces
Syr. of gum arabic ..... 1 ounce
Cherry-laurel water ..... 1 ounce
A teaspoonful four times a day.

RINGWORM.

Hydrag. C. C. ..... 10 grains
Alcoholis ..... 1 ounce
Ol. sinapis ..... 1 drachm
Mft. lotion and apply several times a day.

Corrosive sublimate ..... 10 grains
Alcohol ..... 1 ounce
Oil of mustard ..... 1 drachm
Make lotion and apply several times a day.

SPITTING OF BLOOD (LUNGS) HEMOPTYSIS.

Tinct. cinnamoni ..... 2 drachms
Tinct. digitalis ..... 30 drops
Ex. ergot fld. ..... 14 drachms
Sig.—A teaspoonful every hour and then decrease.

Tincture of cinnamon ..... 2 drachms
Tincture of digitalis ..... 30 drops
Fluid ext. of ergot..... 14 drachms
A teaspoonful every hour and then decrease.

SPITTING OF BLOOD (STOMACH) HEMATEMESIS.

Ferri et ammon. sulph..... 50 grains
Aq. cinnamoni ..... 4 ounces
Sig.—A tablespoonful every two or three hours.

Sulphate of iron and ammonia 50 grains
Cinnamon water ..... 4 ounces
A tablespoonful every two or three hours.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

SORE EYES (CONJUNCTIVITIS).

LATIN.	ENGLISH.
Acid boracic ..... 8 grains	Boracic acid ..... 8 grains
Aq. camphora ..... 1 ounce	Camphor water ..... 1 ounce
Aq. dest ..... 1 ounce	Distilled water ..... 1 ounce
Mft. Bathe the eye several times a day.	Bathe the eyes several times a day.

SUPPRESSED MENSES (AMENORRHEA).

Tinct. ferri chlor ..... 3 drachms	Tinc. chloride of iron..... 3 drachms
Tinct. cantharides ..... 1 drachm	Tinc. Cantharides ..... 1 drachm
Tinct. guaiac ammon..... 1½ ounces	Ammoniated tinc. of guaiac 1½ ounces
Tinct. aloes ..... ½ ounce	Tincture aloes ..... ½ ounce
Syrp. simplex ..... 3½ ounces	Syrup simple ..... 3½ ounces
Mft. A tablespoonful three times a day.	A tablespoonful three times a day.

SLEEPLESSNESS (INSOMNIA).

Potass. bromid ..... 4 drachms	Bromide of potash ..... 4 drachms
Chloral hydrate ..... 2 drachms	Hydrate of chloral ..... 2 drachms
Syrp. prunus virg..... 1 ounce	Syr. of wild cherry ..... 1 ounce
Aq. dest ..... 10 drachms	Water ..... 10 drachms
Sig.—A teaspoonful at bedtime.	A teaspoonful at bedtime.

SORE THROAT (QUINSY).

Tinct. guaiac ..... 1½ ounces	Tincture of guaiac ..... 1½ ounces
Glycerina ..... 1½ ounces	Glycerine ..... 1½ ounces
Sig.—A teaspoonful every hour or two.	A teaspoonful every hour or two.

SCARLET FEVER.

Tinct. ferri chlor..... 2 drachms	Tinc. chloride of iron..... 2 drachms
Potass. chlor. ..... 3 drachms	Chlorate potash ..... 3 drachms
Syrp. simplex ..... 4 ounces	Simple syrup ..... 4 ounces
Sig.—A teaspoonful every hour to a child four or five years old. Increase or decrease according to age.	Teaspoonful every hour to child four to five years old. Increase or decrease according to age.
Resorcin ..... 2 drachms	Resorcin ..... 2 drachms
Vaseline ..... 1 ounce	Vaseline ..... 1 ounce
Mft. Apply to skin to hasten desquamation.	Apply to skin to hasten desquamation.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

TOOTHACHE.

LATIN.

Pulv. arsenious acid ..... 30 grains
Heroin ..... ⅛ grain
Menthol crystals ..... 8 grains
Glycerine ..... Sufficient
Mft. paste. Sig.—Apply to tooth on absorbent cotton.

Creosotum ..... 1 drachm
Apply to the cavity of the tooth on cotton.

ENGLISH.

Powd. arsenious acid ..... 30 grains
Heroin ..... ⅛ grain
Menthol crystals ..... 8 grains
Glycerine ..... Sufficient
Make paste. Apply to tooth on absorbent cotton.

Creosote ..... 1 drachm
Apply to the cavity of the tooth on cotton.

VOMITING.

Pepsinæ ..... 1 drachm
Acid hydrochlor dil. ..... 2 drachms
Aq. dest. ..... 6 drachms
Sig.—Teaspoonful every two or three hours.

Pepsin ..... 1 drachm
Hydrochloric acid, diluted.. 2 drachms
Water ..... 6 drachms
Teaspoonful every two or three hours.

WETTING OF BED (INCONTINENCE OF URINE).

Ergotin ..... ½ grain
Strych. sulph. ..... 1-200 grain
Ext. bella. ..... 1-64 grain
In each pill. One three or four times a day.

Strych. sulph. ..... 1 grain
Pulv. cantharides ..... 2 grains
Morph. sulph. ..... 1½ grains
Ferri redacti ..... 20 grains
Mft., mass and div, in pil. No. XL.
Sig.—One pill three times a day to a child ten years old. Increase or decrease according to age.

Ergotin ..... ½ grain
Sulphate of strychnine..... 1-200 grain
Extract of belladonna ..... 1-64 grain
In each pill. One three or four times a day.

Sulphate of strychnine..... 1 grain
Powdered cantharides ..... 2 grains
Sulphate of morphia ..... 1½ grains
Reduced iron ..... 20 grains
Make 40 pills. Give one pill three times a day to a child ten years old. Increase or decrease according to age.

WHITES (LEUCORRHEA).

Tri-Septic Douche Tablets No. 24. One or two dissolved in a pint of warm water as an injection night and morning.

Soda bicarb. ..... 1 drachm
Tinct. belladonna ..... 2 ounces
Aq. dest. ..... 1 pint
Mft. Use as a vaginal injection.

Aristol ..... 35 grains
Camphora ..... 35 grains
Lupulin ..... 35 grains
Mft. suppositories No. XII. Insert one in vagina after each injection.

Tri-Septic Douche Tablets No. 24. One or two dissolved in a pint of warm water as an injection night and morning.

Bicarbonate of soda ..... 1 drachm
Tincture belladonna ..... 2 ounces
Water ..... 1 pint
Use as a vaginal injection.

Aristol ..... 35 grains
Camphor ..... 35 grains
Lupulin ..... 35 grains
Make 12 suppositories. Insert one in vagina after injection.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

WATER-BRASH (PYROSIS).

LATIN.		ENGLISH.	
Quinia sulph.	12 grains	Sulphate of quinine	12 grains
Acid sulph. dil.	2 drachms	Sulphuric acid, diluted	2 drachms
Spts. chloroform	2 drachms	Chloroform	2 drachms
Tinct. aurant. cort.	1½ ounces	Tinc. of orange peel	1½ ounces

Sig.—A teaspoonful in water every two or three hours.

A teaspoonful in water every two or three hours.

WHOOPING-COUGH (PERTUSSIS).

Cocci	10 grains	Cochineal	10 grains
Potass. bicarb.	1 drachm	Bicarbonate of potash	1 drachm
Ex. belladonna fld.	10 drops	Fluid ext. of belladonna	10 drops
Syrp. simplex	4 ounces	Syrup simple	4 ounces

Sig.—A teaspoonful every two or three hours for a child ten years old. Increase or decrease according to age.

Teaspoonful every two or three hours for a child ten years old. Increase or lessen according to age.

WORMS (TAPE).

Tinct. rottlera	1 drachm	Kameela	1 drachm
Ex. filix mas aeth.	2 drachms	Male fern, ethereal ext.	2 drachms
Syrp. acacia	1 ounce	Syrup of gum arabic	1 ounce

Mft. Make 2 doses. Sig.—First in morning, two hours after half-ounce ol. ricini, and in half an hour the remainder.

Make 2 doses. Take first in morning; two hours after take dose of castor oil, and in half an hour the remaining dose.

WORMS (ROUND AND STOMACH).

Hyd. chlor. mite	10 grains	Calomel	10 grains
Soda bicarb.	10 grains	Bicarbonate of soda	10 grains
Santonine	10 grains	Santonine	10 grains
Pv. rhei	10 grains	Rhubarb	10 grains

Mft. cht. No. VI. Sig.—One every three hours and then a purge.

Make 6 powders. Take one every three hours and then a purge.

SIMPLE REMEDY FORMULAS IN LATIN AND ENGLISH

THE DOSES ARE FOR ADULTS, EXCEPT WHERE OTHERWISE MENTIONED. SEE FOOTNOTE.

ASTHMA.

LATIN.		ENGLISH.	
Lobelia folia	1 teacupful	Lobelia leaves	1 teacupful
Aqua bulliens	1 pint	Hot Water	1 pint

Steep a half hour. Dose: One tablespoonful every fifteen to thirty minutes till free spitting of mucus is produced.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

BOILS.

LATIN.	ENGLISH.
Sulphur flores ..... 6 tablespoonfuls	Flowers of sulphur .. 6 tablespoonfuls
Potass. bitartras ..... 3 tablespoonfuls	Cream tartar ..... 3 tablespoonfuls

Dose: One teaspoonful night and morning in syrup or molasses.

BLEEDING FROM THE LUNGS.

Pulv. sacch, alb..... 3 ounces	Powdered sugar ..... 3 ounces
Acid gallic ..... ½ ounce	Gallic acid ..... ½ ounce

Mix. Dose: One teaspoonful three times a day.

Or,

Acid tannic ..... 30 grains	Tannin ..... 30 grains
Pulv. sacch. alb..... 1 drachm	Powdered sugar..... 1 drachm

Mix. Make ten powders and give one every ten minutes until relieved.

CHOLERA MORBUS.

Chloride sodium .... 3 teaspoonfuls	Common salt ..... 3 teaspoonfuls
Piper nigrum ..... 2 teaspoonfuls	Black pepper ..... 2 teaspoonfuls
Acetum ..... ½ teacupful	Cider vinegar ..... ½ teacupful
Aqua bulliens ..... ½ teacupful	Warm water ..... ½ teacupful

Mix. Take tablespoonful every half hour until relieved.

CONSTIPATION.

Inf. senna comp ..... 5 ounces	Compound infusion of senna 5 ounces
Potass. tart. ..... 1 ounce	Tartrate of potash ..... 1 ounce
Tr. senna } of each ..... 4 drachms	Tincture of senna } of each.. 4 drachms
Tr. jalap }	Tincture of jalap }
Syr. rhamni ..... 3 drachms	Syrup of buckthorn ..... 3 drachms

Dose: Take one-fourth part at once, and repeat the dose every half hour until it operates.

CROUP.

Pulv. alumen ..... 2 teaspoonfuls	Powdered alum ..... 2 teaspoonfuls
Treacle ..... 1 tablespoonful	Molasses ..... 1 tablespoonful
Aqua bulliens ..... 1 teacupful	Warm water ..... 1 teacupful

Dose: For child one to three years old, a dessertspoonful every five minutes till relieved; for older children, a tablespoonful.

DIARRHŒA.

Rubus villosus ..... 2 quarts	Ripe blackberries ..... 2 quarts
Saccha alba ..... 1 pound	White sugar ..... 1 pound
Carophyllus ..... ½ ounce	Cloves ..... ½ ounce
Pimenta ..... ½ ounce	Allspice ..... ½ ounce

Boil all together. When cold press and strain. Add a pint of good brandy. Dose: A teaspoonful to wineglassful every two to four hours.

DROPSY.

Pulv. jalapa ..... 10 grains	Powdered jalap ..... 10 grains
Potass. bitartras ..... 1 teaspoonful	Cream tartar ..... 1 teaspoonful
Aqua sacch ..... 1 wineglassful	Sweetened water ..... 1 wineglassful

Take whole, once every four hours, until copious discharges are produced.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

DYSENTERY.

LATIN.		ENGLISH.	
Amylum	2 ounces	Thin boiled starch	2 ounces
Tinct. opii	20 drops	Laudanum	20 drops

Use as an injection every six to twelve hours.

Tinct. rhei	1 ounce	Tincture rhubarb	1 ounce
Tinct. opii	2 drachms	Laudanum	2 drachms

Dose: One teaspoonful every three hours.

EARACHE.

Succus alium	2 teaspoonfuls	Onion juice	2 teaspoonfuls
Ol. olivæ	2 teaspoonfuls	Sweet oil	2 teaspoonfuls
Tinct. opii	1 teaspoonful	Laudanum	1 teaspoonful

Mix, and drop from four to six drops warm in affected ear. Repeat in half an hour if necessary.

GOUT.

Pulv. ulmus	2 tablespoonfuls	Powdered slippery elm	2 tablespoonfuls
Wheat bran	3 tablspoonfuls	Wheat bran	3 tablespoonfuls

Mix with a weak solution of vinegar and apply warm to the affected parts.

GRAVEL.

Pyrus rad	1 quart	Apple root tea	1 quart
Holland gin	1 pint	Holland gin	1 pint
Sacch. alb	8 ounces	White sugar	8 ounces

Small teacupful three times a day.

HEART-BURN.

Soda bicarb.	½ teaspoonful	Baking soda	½ teaspoonful
Aqua	½ teacupful	Water	½ teacupful

Take same after each meal.

HOARSENESS.

Armoricia	2 ounces	Horseradish, grated	2 ounces
Acetum	½ pint	Cider vinegar	½ pint
Mel	1 gill	Strained honey	1 gill

Put the horseradish in the vinegar, let stand twelve hours, add the honey and heat it nearly to boiling. Strain and bottle. Adult dose, a teaspoonful four times a day till relieved.

INFLAMMATION OF THE BOWELS.

Ol. ricini	3 ounces	Castor oil	3 ounces
Ol. olivæ	2 ounces	Olive oil	2 ounces
Ol. terebinthinæ	2 teaspoonfuls	Oil of turpentine	2 teaspoonfuls

Adult dose, one tablespoonful every three or four hours.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

NEURALGIA.

LATIN.		ENGLISH.	
Ex. belladonna	½ ounce	Extract belladonna	½ ounce
Vaseline	2 ounces	Vaseline	2 ounces

Mix. Rub on affected parts several times a day.

PILES.

Vaseline	1 tablespoonful	Vaseline	1 tablespoonful
Sulph. flores	1 drachm	Flowers of sulphur	1 drachm

Mix, and apply as an ointment three times a day.

SIMPLE SORE THROAT.

Pulv. alumen	1½ teaspoonfuls	Powdered alum	1½ teaspoonfuls
Aqua	1 gill	Water	1 gill

Make gargle and use every hour.

SCROFULA.

Rumex crispus	1 pound	Yellow dock root	1 pound
Stillingia rad	1 pound	Stillingia root	1 pound
Taraxacum rad	1 pound	Dandelion root	1 pound
Sarsaparilla rad	1 pound	Sarsaparilla root	1 pound
Sassafras rad	½ pound	Sassafras root	½ pound
Aqua	4 gallons	Water	4 gallons

Cut the roots fine. Boil slowly till reduced to four quarts. Strain and add five pounds white sugar, stirred in with gentle heat. Then add eight drachms iodide of potash. Dose: Two tablespoonfuls three times a day.

SORE EYES.

Soda biboras	2 grains	Borate of soda	2 grains
Aq. camph.	1 ounce	Camphor water	1 ounce

Mix. Drop one or two drops in eye four times a day.

TETTER.

Ol. terebinthinæ	1 ounce	Turpentine	1 ounce
Hydrarg. ox. rub	3 drachms	Red Precipitate	3 drachms
Vaseline	4 ounces	Vaseline	4 ounces

Mix. Apply twice a day to affected parts.

TAPEWORM.

Ol. terebinthinæ	1 teaspoonful	Turpentine	1 teaspoonful
Ol. ricini	1 teaspoonful	Castor oil	1 teaspoonful
Lactis	1 teacupful	Milk	1 teacupful

Mix, and for adult take at one dose. If not successful, repeat next day.

WETTING THE BED.

Ergot fluid ex	1 ounce	Spurred rye	1 ounce

Dose: Ten to fifteen drops three times a day.

Children's Doses: Between one and two years, one-seventh of an adult dose; between two and six years, one-quarter; between six and twelve years, one-third; between twelve and fifteen years, one-half.

PART V OF BOOK IX

Describes the very newest remedies, their properties, doses and manner of using.

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Home Administration of Medicine

PART V.

NEW REMEDIES

Acetozone.—A germicide used frequently in typhoid fever, internally, thirty grains to the half gallon, given two to four ounces every four hours. Locally, diluted with boric acid, in surgery and gynecology.

Adalin.—Colorless and odorless powder. Sedative and hypnotic, promoting sleep. Dose, five to ten grains in water one hour before retiring.

Afsal.—A yellowish-white powder used in rheumatism in thirty to sixty grain doses during twenty-four hours.

Agaricin.—A white powder recommended for night sweats in phthisical subjects. Dose, one to one and one-half grains at night.

Agurin or Theobrimine Sodium.—Dose, five to ten grains, as a diuretic, three or four times a day.

Akaralgia.—A granular, effervescent laxative containing salicylate of soda and magnesia sulphate. Used as a migraine and antirheumatic.

Albolene, Blandine Liquid, Vaseline, Glycoline.—A refined liquid petroleum under various trade names. Used as oil sprays for catarrhal conditions of the nose, and also given internally in doses from two to four teaspoonfuls three times a day for chronic constipation.

Ammonol.—A composition similar to acetanilide comp. Used for neualgia, etc.

Anasarkin.—Tablets containing extract of sambucus, scilli picrin, etc., used as a diuretic.

Antifebrin is an American trade name, and in Germany the official title for acetanilide.

Antiphlogistine.—A clay poultice containing glycerine, oil of wintergreen, boric acid, etc., used locally for sprains and various inflammations.

Apioline.—Prepared from parsley seed. Prescribed in amenorrhea and dysmenorrhea.

Apetol.—Composed of nux vomica, gentian, columba, quassia, etc., a bitter tonic useful in exciting the flow of gastric juice, aiding digestion and improving the appetite.

Argyrol, Protargol, Collargolum.—Silver in organic combination. Used instead of nitrate of silver for various local conditions, especially gonorrhœa and purulent eye diseasse.

Aristol.—Similar to iodide of thymol. Used locally as a dusting powder for ulcers, ulcerating sores, etc.

Aspirin.—A derivative of salicylic acid. White powder in soluble form. Used in all conditions in which the salicylates are used. Rheumatism, gout, neuralgias, sciatica, etc. Dose, five grains repeated.

Atophan.—Indicated in gout, acute and chronic rheumatism, gonorrhœal rheumatism, sciatica, lumbago, etc. Dose, seven to ten grains three or four times a day with water.

Avenine.—An extract of oats used as a nerve tonic in sexual conditions.

Baume Analgesique.—A combination of menthol, salicylate of methyl, and lanoline. Used locally for rheumatism, neuralgia, migraine, sprains, herpes zoster and many ailments of greater or less importance.

Betol.—Also known as naphthalol. Used in gonorrheal cystitis, articular rheumatism, etc.

Borolyptol.—A liquid antiseptic for local and internal use, containing eucalyptus, myrrh, benzoin, etc.

Cann-Aven.—A combination in pill form for the treatment of seminal emissions, nervous debility, spermatorrhœa, impotence, etc.

Cellasin.—A ferment derived from Fungi—said to be curative in diabetes and various forms of malnutrition.

Capsolin.—A counter-irritant ointment, containing camphor, oil of turpentine, oleoresin of capsicum. Used locally in neuralgia, pleurisy, etc.

Chola-Sal.—A pill or capsule used in the treatment of gall stones and diseases of the gall duct and bladder.

Copa-Kava.—A pill composed of oil of santal copaiba, kava-kava, etc. A combination valuable in the relief of gonorrhœa, gleet, cystitis, and all irritating conditions of the bladder and prostate.

Corydallis.—Specific medicine, used in syphilis owing to its alterative effect; also employed in scrofulous and tubercular diseases. It relieves periosteal skin pains and syphilis nodes.

Creolin.—A saponified coal tar. Used locally as a germicide disinfectant and deodorant.

Dioxogen.—A trade name for peroxide of hydrogen solution.

Epinephrin.—Also known as adrenalin, etc. A powerful astringent, hemostatic and heart stimulant. Applied to a bleeding surface or nose bleeding it will control the bleeding at once. In hay fever, in a solution in water or oil, used with an atomizer three to six times a day, it affords wonderful relief to the patient, making him comfortable and shortening the disease. It is also used as a heart stimulant in small doses, but should be given under the direction of a physician.

Europhen.—Yellowish-brown powder. Used locally for venereal sores, chancres, ulcers, etc.

Formalin.—A solution of formaldehyde gas. Employed as a disinfectant and deodorant, especially in contagious diseases. Poisonous.

Hedonal.—A white powder sparingly soluble in water, used as a mild hypnotic. Dose 10 to 20 grains.

Helmitol, Cystogen, Formin, Urotropin.—These are various names given to the urinary antiseptic hexamethylane-tetramine. They are used in five to ten grain doses dissolved in water, for cystitis, acute and chronic conditions of the bladder from prostatic enlargement, also in gonorrhœa.

Hemabaloids.—An iron tonic combined with bone marrow, given in teaspoonful doses.

Hemostyptic.—A fluid extract of ergot and golden seal, used internally for hemorrhage in thirty drop doses three times a day.

Heroin.—A trade name for acetyl morphine used as a sedative in cough mixture and to relieve pain.

Hermotone.—Contains the active principles of the thyroid and other secretory organs used in the treatment of neurasthenia, presenility and sexual weakness.

Hydrastis.—Colorless. Used as an injection in gonorrhœa alone or combined with various astringents.

Hydrassan.—A mixture of phenacetin chlorides of mercury, arsenic, etc., used in chronic syphilis.

Iatrol.—A combination of iodine, etc., used instead of iodoform (odorless) as a local antiseptic.

Ichthalbin.—A compound of ichthyol and albumen a gray-brown odorless powder for internal used instead of ichthyol. Dose 10 to 30 grains.

Ichthyol.—Consists largely of ammonium salts of sulphonic acid ob-

tained from the fossil remains of fish, a thick brown liquid used mostly in various skin diseases and gynecological affections.

Ingluvin.—A pepsin obtained from the gizzard of the chicken, a digestive and used in vomiting of pregnancy.

Iodoformal.—A compound iodine powder used as a local antiseptic.

Iodex.—A non-staining iodine ointment containing 5 per cent. of iodine, used instead of iodine.

Kaolin.—White earth, used as a base for catapiasm of kaolin and also used as an absorbent dusting powder.

Kinazyme.—An extract of the spleen, liver and pancreas used to increase weight in malnutrition and wasting diseases.

Labronium.—Has been found valuable in cases in which the bromides have been used. Hysteria, nervous sleeplessness, epilepsy, etc.

Lactone.—Tablets used to prepare buttermilk from fresh milk, one tablet converting one quart of milk into buttermilk in thirty-six hours.

Lactopeptine.—A compound digestive powder composed of pepsin, pancreatin, lactic acid, etc.

Laxol.—The trade name for a flavored and sweetened castor oil.

Lymph Orchitis Compound.—An organic preparation used in impotence, presenility, neurasthenia, etc.

Lysol.—Disinfectant and germicide. When mixed with water it is used for cleansing wounds, ulcers, etc., also on floors and for washing bedding.

Melachol.—A compound solution of phosphate of soda, nitrate of potash and citric acid used as a laxative.

Melubrin.—In pill or powder form possessing the medicinal activity of the salicylate, effective in sub-acute and chronic forms of rheumatism and as an antineuralgic. The dose is from seven and a half to fifteen grains three or four times a day.

Mercauro.—A solution of the bromides of mercury, arsenic and gold. Alterative and antisyphilitic. Dose, 10 drops three times a day.

Methylene Blue.—An aniline product used as an urinary disinfectant, frequently used in combination for gonorrhœa.

Morrhual.—An extract of cod liver oil put up in capsules and used in similar cases as cod liver oil.

Napthal Bismuth.—Same as orphol.

Neosalvarsan.—Similar to salvarsan or 606 used in syphilis.

Nephritin.—Employed in Bright's Disease and other disturbances of the kidneys.

Neurotina.—A tablet containing nux vomica, iron, sawpalmetto, etc., used in sexual neurasthenia.

Oil of Cassia.—This oil is said to be effective in curing Barber's Itch and is also said to be good in allaying the poisonous effects of poison ivy, but it is essential that the true oil be used.

Omoform.—A fine, odorless, yellowish powder used as a substitute for iodoform.

Ovoferrin.—A mild form of organic iron in liquid form.

Panopepton.—A liquid food.

Papain, Papoid, Caroid.—Vegetable pepsins obtained from the juice of the pawpaw. Dose 2 to 5 grains.

Peptonoids Liquid.—A liquid food containing protein and carbohydrates from beef, wheat, etc., used especially in fever cases.

Phenacetin.—White, odorless and tasteless powder, useful for the allaying of fevers, also as an analgesic for the relief of headaches, neuralgias, etc. Dose, two to five grains.

Piperazine.—Used in cases of gout and rheumatoid arthritis, gravel and renal calculus. Dose, ten to twenty grains twice a day with an abundance of water.

Phycologen.—A name applied to a line of vaccines used hypodermically in rheumatism, gonorrhœa, etc.

Phenol Phthalein.—Used as a laxative and cathartic. A tasteless powder. Can be given to children as well as adults in doses from one to three or four grains. It produces watery stools. It is also given in pill form and in various combinations.

Pituitrin.—A stimulant to the uterus and used by physicians during labor when the pains have ceased and the labor is slow.

Pollantin.—A name applied to hay fever serum.

Rheumalgine.—Rheumalgine is diuretic, a urinary antiseptic, a solvent for uric acid deposits and promotes the elimination of septic products through both great channels, the urinary and alimentary tracts. It is of established value in the treatment of acute articular and chronic rheumatism, muscular pains, lumbago, sciatica, migraine of the rheumatic, gout and nervous irritability of the gouty or "lithemic." Whether they are due to auto-infection resulting from faulty elimination or to uric

acid diathesis. Rheumalgine is an efficient and rational treatment for rheumatic disorders. Dose, one to three tablets three or four times a day.

Salo Santol.—A combination of Santol oil and Salol used in gonorrhœa.

Saletin.—A trade name for aspirin.

Salvarsan or 606, used as a specific in syphilis.

Scarlet Red.—Used in 5 to 10 per cent. ointment on ulcers and wounds free from edematous swelling.

Staphisagria-Specific.—Used to allay irritation about the prostate gland and testicles and to check prostatorrhœa and spermatorrhœa. A nerve stimulant for gloomy forebodings. Exercises a specific action upon the reproductive organs. Quiets irritation of the testes and strengthens their function.

Stypticin.—Used in hemorrhage, especially uterine.

Sulphonol.—Hypnotic and sedative. Dose, five to ten grains for the production of sleep.

Taka Diastase.—A brownish nearly tasteless powder used in indigestion due to starchy foods.

Theobromine.—An alkaloid found in cocoa, etc., used as a diuretic.

Tri-Septic Douche Tablets.—Antiseptic, cleansing, healing. For leucorrhœa, inflammation of the uterus and vagina. Non-poisonous. Freely soluble in water, odorless and will not stain.

Tablogestin.—Used to relieve torpid or inactive liver and intestinal putrefaction. Also used in the treatment of catarrh of the bile tract and the prevention of gall stone formation.

Trionol.—Hypnotic and sedative. White powder soluble in hot water. Used in five to ten grain doses for insomnia.

Trypsogen.—Used in diabetes mellitus in connection with diet for that condition.

Yohimbin.—A remedy for impotency, an alkaloid obtained from yohim behe bark. It is said to combat sexual impotency. Its effect is more marked when the trouble is due to a functional disturbance associated with a constitutional disease, as obesity, nephritis, or in sexual neurasthenics.

BOOK X

Treats of the home administration of simple remedies for many ills. It tells you what to do in case of sickness and the absence of the doctor.

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Book X

What to do in the Absence of a Doctor

HOME ADMINISTRATION OF MEDICINES

SIMPLE REMEDIES FOR MANY ILLS.

Abscess.—Make a mixture of equal parts of rosin and sugar, and apply for several days till broken; if not, poultice hourly with flaxseed meal or bread and milk or hop poultice, or an ointment of oleate of mercury and morphia may be used.

Ague.—Give full doses of quinine.

Alcoholism.—Remove the cause and give half teaspoonful of compound tincture of cinchona, with about three drops of tincture nux vomica every three hours, or give pill dipsomania.

Amenorrhea.—Use warm sitz baths and take five grains chloride of ammonia every three hours.

Anemia.—Sponge body morning and evening with a solution of rock salt and whiskey and give iron and quinine as tonic—four grains of reduced iron and half grain of quinine—three times a day. Pepto Mangan is also an excellent tonic.

Angina Pectoris.—Inhale the fumes of chloroform or ether, or nitrite of amyl tears, one broken in handkerchief and inhale, and give one-twentieth grain of arsenic every three or four hours.

Apoplexy.—This state is caused by the rupture of a blood vessel within the skull and consequent escape of blood and pressure on the brain, or by the clogging of a blood vessel, thus cutting off the blood supply to

some part of the brain. The result is the same in either case: a part of the brain ceases to perform its functions owing to pressure of the clot. If the clot be small the effect will be slight; if it be large the effect will be grave if not fatal. The sufferer loses consciousness, sometimes falling as if felled by a heavy blow, sometimes becoming insensible more slowly. In well-marked cases, no effort will arouse the patient from insensibility. The face is flushed and the pupils of the eyes generally dilated, or one may be dilated and one contracted. Breathing is slow and labored; snoring may occur; cheeks are often puffed out with each respiration, the air being blown through the lips. Pulse is slow, full and hard. Paralysis is an important symptom and must be looked for. Paralysis generally is only on one side—the face, arm and leg on the same side being commonly affected. The mouth is usually drawn away from the affected side of the face.

TREATMENT.—Lay patient down, head and shoulders slightly raised; loosen clothing about neck and body; wrap cracked ice in a towel and place it on the head, or wrap head in wet cloths and keep them cold until arrival of the doctor. If without medical advice for long period, empty the bowels by giving an injection of soap and warm water, at the same time giving a cathartic, castor oil or salts, if the patient can swallow. Keep the patient quiet. *Do not give any stimulant.*

Apthae.—See *Sore Mouth.*

Asthma.—Make strong solution of saltpetre and saturate pieces of blotting paper and dry. When a paroxysm is felt ignite a piece of the paper and inhale the smoke. This acts most quickly, alleviating distressing symptoms and shortens the paroxysm.

No fixed formula can be always depended upon; for a remedy which will benefit one case will often prove useless in another.

TREATMENT.—1. One of the best preparations is:

Iodide of potash	1½	drachms
Spirits Ether Co.	3	drachms
Syrup of wild cherry	4	ounces

Two teaspoonfuls in water three times a day.

2. Another remedy, highly recommended, is thus prepared:

Lobelia leaves	1 teacupful
Hot water	1 pint

Steep one-half hour. Take one tablespoonful at a dose every fifteen to thirty minutes until free spitting of mucus is produced.

3. For very urgent cases the following is generally satisfactory, but must be used with caution:

Ether	½ teaspoonful
Laudanum	10 drops
Water	1 wineglassful

To be taken only once, or at most twice, and if second dose is given, it must not be sooner than six hours after the first dose.

Backache.—Apply a mixture of one part of turpentine to two parts of sweet oil to the back two or three times a day. Use mixture warm. Chloroform liniment is also recommended.

Barbers' Itch.—Excellent results have been received with the following treatment: Thoroughly wash the affected area with good soap and dry. Then apply a mixture of equal parts of alcohol and solution of peroxide of hydrogen, to which has been added bichloride of mercury, in the proportion of four grains to the ounce. The hydrogen peroxide seems to help carry the more powerful antiseptic into the infected areas about the hair-follicles.

TREATMENT.—1. In addition to the citrine ointment and vaseline recommended for ringworm, the following will be found excellent for barber's itch, and an almost infallible cure for common itch:

Plain vaseline	4 ounces
Sulphur	2 ounces
Sal ammoniac, powdered	2 drachms

Mix and apply daily, after cleansing the part thoroughly with castile soapsuds.

2. Another good ointment is composed of:

Plain vaseline	2 ounces
Venice turpentine	½ ounce
Red precipitate	½ drachm

Apply in same manner. Great care should be taken not to expose affected parts to cold draughts while ointment is in use, especially if the affected surface is large.

Bilious Fever.—Take about ten drops of the fluid extract of wild indigo-root in a little water, once in four hours. After a day or two commence with one grain of cinchonidia. To be taken every three hours.

Biliousness.—Use the juice of half a lemon each morning before breakfast. Boil two ounces of quassia root in one pint of water and strain. Take a teaspoonful every four hours for a week or two.

Bile, Deficiency of.—Give one grain of mercury and chalk (gray powder) three times a day.

Bites and Stings.—Apply a solution of saltpetre, one or two teaspoonfuls to a cup of water.

TREATMENT.—The irritation and itching caused by the bites and stings of insects, such as the mosquito, bee, hornet, and so forth, are relieved by the prompt application of spirits of ammonia (hartshorn), or of the juice from common plantain. For treatment of snake bites and other poisoned wounds, see Poisons and Antidotes.

Bladder, Irritable.—Bicarbonate of soda; sweet spirits of nitre.

Bladder, Inflammation of.—Give a mixture of one ounce tincture cubebs, one ounce tincture buchu and two drachms sweet spirits of nitre. Half a teaspoonful in water every two or three hours. Another remedy is an infusion of pipsissewa root, one ounce to pint of boiling water, and give wineglassful three or four times a day. Keep parts well warm with poultices and so forth over bladder. Drink plentifully of hot tea, which is an excellent remedy.

Bleeding from the Lungs.—TREATMENT.—1. The most common remedy, and one usually effective, is common salt, which should be eaten freely, a teaspoonful at a time, until relief is obtained; or half teaspoonful of fluid extract of ergot, repeated.

2. In obstinate cases, the patient should be kept perfectly quiet, and this powder given:

Gallic acid	60 grains
Powdered sugar	1 drachm

Make ten powders and give one every ten minutes.

[N. B.—Since spitting blood may be only a symptom of a much more serious trouble, a physician should always be called in when obtainable.]

Bleeding from the Nose.—Inject a strong solution of alum, made with one-quarter teaspoonful of alum to half teacup of water, into each nostril, and place cotton saturated with same to nostril. Apply cold to the nose.

When obstinate, take cobweb or grated salt beef, hard and dry, and push it into the nostril as far as possible. External pressure from thumb

and finger, continued fifteen or twenty minutes, will also be of benefit.

Another good method is to apply cold water or ice to forehead, also to back of the neck; or locally adnephrin applied on cotton.

Bleeding from the Stomach.—This is often a serious condition and a physician should be consulted at once.

Blood Poisoning.—Quinine sulphate, one scruple; tincture chloride of iron, one and one-half drachms; simple syrup, two ounces; make mixture and give half teaspoonful four times a day.

Blood Purifier.—Sarsaparilla tea, a tablespoonful three or four times a day. Cream of tartar, half a teaspoonful night and morning in water.

Boils.—A quick poultice for a boil may be made of equal parts of soap and brown sugar, spread on a cloth and faithfully applied. The following powder may be taken internally to cleanse the system of impurities: Six tablespoonfuls of flowers of sulphur and three tablespoonfuls of cream of tartar, well mixed and one teaspoonful taken each morning and night in syrup or molasses.

Brain Fever.—Give from five to twenty drops of the following mixture every hour or two during the excitement: Tincture aconite root, thirty drops; tincture yellow jasmine, two drachms; sweet spirits nitre, one drachm; simple syrup, two ounces. Consult physician.

Bright's Disease.—Use skimmed milk freely, both at meals and between, and apply soothing fomentation to small of back, as infusion of hops with laudanum; and Bascham's Mixture, tablespoonful three times a day. Consult physician.

Bronchitis.—To a pint of flaxseed tea add the juice of two lemons and about three tablespoonfuls of sugar, and take a teaspoonful every half hour until relieved. If desired, you can add a small quantity of chloride of ammonia. Another remedy is to encircle the chest with flaxseed poultice and give three drops of aconite with ten drops sweet spirits of nitre, every two or three hours.

Bunion.—Apply adhesive plaster to part; put about a half teaspoonful of salicylic acid to two tablespoonfuls of lard and apply morning and night.

Burns or Scalds.—Put a teaspoonful of alum in a pint of water, and bathe parts frequently. Keep the parts well wet with this solution, which extracts the heat in a remarkable manner and soothes the patient into a calm and refreshing sleep. Apply equal parts of limewater and linseed oil.

Cancer.—Give a tablespoonful of sarsaparilla tea, made with two ounces of sarsaparilla root in quart of water boiled to pint; and apply to

cancer growth a poultice made of carrots scraped or mashed cranberries. Consult a physician.

Carbuncles.—Carbuncles are much more serious than boils. Consult Index for full discussion of. As temporary relief to pain, etc., apply one part tincture belladonna with two parts glycerine, and over this apply a warm poultice. Other treatments are:

1. To draw or ripen them, a poultice of poppy leaves is very efficacious.

2. Equally effective is a poultice made of sassafras root and slippery elm bark, boiled together, and the decoction thickened by stirring in cornmeal.

3. Linseed and slippery elm decoction, mixed with a little charcoal and yeast, used as a warm application, or lotion, seems to lessen pain and inflammation.

4. Carbuncles which head slowly should be opened with a knife, not by sticking, but by two transverse incisions. Menthol ethereal solution, 10 to 50 per cent., applied by camel's-hair brush, aborts boils, carbuncles and inflammatory gatherings.

Catarrh.—Use a mixture composed of one teaspoonful of common salt, a teacup of milk and half pint of warm water as injection for nostrils three times a day; or same quantity of borax can be substituted for the salt or alkaline antiseptic solution.

This results from neglected or repeated attacks of the acute form, or following measles, scarlet fever, and so forth. There is a constant offensive discharge from the nose and nasal passages, pain in the eyes and head, sneezing, loss of appetite, and so forth.

TREATMENT.—A snuff composed of

Bloodroot	2 ounces
Bayberry root	1½ ounces
Peruvian bark	2 ounces
Borax, pulverized	½ ounce

finely pulverized and mixed, should be kept on hand and constantly snuffed into the nostrils. The bowels must be kept open by taking occasional simple purgatives. Strength should be kept up by the use of tonic pills.

Locally use to the nose and throat liquor antisepticus alk. with an atomizer three or four times a day.

Catch in the Breath.—Cold sponging for infants waking with a catch in the breath at night.

Chafing.—Use powdered cornstarch freely after bathing and drying (well) the parts, or talcum powder.

Treatment.—Afflicts children and fleshy persons. Usually all that is required is washing well with castile soap and cold water, and anointing with plain vaseline. A solution, to be used twice a day in connection with frequent washing in cold water, is composed of:

Pure water	2 gills
Powdered borax	1 teaspoonful
Sulphate of zinc	½ teaspoonful

Apply by means of a soft rag several times daily. After drying well, dust the parts with wheat flour or cornstarch, powdered magnesia or talcum powder.

Change of Life.—For flushings, and so forth, three grains of bromide of potash every three hours. For headaches apply a mixture of two ounces of ammonia and common salt, three ounces of alcohol and thirty-two ounces of water.

Chapped Hands and Face.—Apply a mixture of one-third glycerine and two-thirds rosewater two or three times a day, or cold cream.

Chest, Pains in.—When not from inflammation, apply iodine ointment.

Chicken-Pox.—Keep child in darkened room and give nitre water as drink, and one drop of aconite every two hours for two or three days.

Chilblains.—Apply lime water to part affected several times a day. Another remedy is the application of balsam of Peru ointment or iodine ointment.

Treatment.—1. The first treatment for frosted feet, to be applied at once, before the feet are "thawed out," is rubbing with snow and bathing them in ice-cold water. Let the normal blood-heat be restored very gradually, and continue the cold water treatment for some hours. Do not apply external heat of any kind.

2. For chilblains, the best treatment is frequent bathing in cold water and in a strong decoction of white oak bark. Bandaging the parts loosely with flannels saturated with crude petroleum has cured many cases. These are probably the best remedies, although many others have been tried with varying success.

Chills and Fever, Fever and Ague, Intermittent Fever.—Treatment.—1. Upon the first indications of a chill, the following powder will be found useful:

Sulphate of quinine	30 grains
Extract of podophyllin, pulverized	30 grains
Cayenne pepper, pulverized	1 drachm
Charcoal, pulverized	1 drachm

Mix thoroughly and divide into twenty powders. Dose for an adult is two powders, taken every two hours, until chill has ceased and the hot stage begins.

2. After first powder is taken, patient may be placed in a warm bath and given hot chamomile or mint tea, with a copious sprinkling of cayenne pepper. In place of the warm bath, patient may be covered up warmly in bed and dry heat applied (by means of hot bricks, and so forth) along the spine to the extremities, over the pit of the stomach, and so forth.

3. In the third stage (sweating) patient should be gently stimulated, if great weakness exists, with a little whiskey toddy, warm brandy or some similar drink. Between the ague fits, which may occur every other day, or once in three days, once in four days, or irregularly, give:

Sulphate quinine	30 grains
Sulphuric acid	30 drops
Pure water	1½ ounces

Mix in a bottle and shake well. Dose for an adult: One teaspoonful every two hours, or every hour, if necessary.

4. A good preventive of chills and fever is the following:

Good rye whiskey	4 ounces
Pulverized rhubarb	1 drachm
Pulverized Peruvian bark	1 ounce

Mix in a large bottle, and let it stand for some days. Take a good tablespoonful of the decoction three times a day during the continuance of aguish symptoms.

Choking.—In children who choke with liquids from their birth, from one to two grains bromide of potash every two or three hours.

Cholera Infantum.—Give one-fourth grain of gray powder (mercury and chalk) every hour or two, with lime water and milk for vomiting. Warm poultice to abdomen and bowels.

The following mixture also has been used with great success, in early stages especially:

Prepared chalk	10 grains
Subnitrate of bismuth	10 grains
Paregoric	1½ teaspoonfuls
Syrup of ginger	5 teaspoonfuls
Gum arabic mucilage	5 teaspoonfuls

Mix. Dose for child one year old, one-half teaspoonful two to six times a day, usually not oftener than once in five or six hours. Vomiting may be relieved by giving small pieces of ice, if the child is old enough to swallow them. This treatment will often bring relief, but if it does not, give a teaspoonful of flaxseed tea or slippery elm tea, with (for a child four to six weeks old) one drop of laudanum, once in two or three hours.

Cholera Morbus.—A handy preparation to have in the house for such conditions is the Squibbs' Mixture, composed of laudanum, one ounce; tr. capsicum, one ounce; spirits camphor, one ounce; chloroform, three drachms. Alcohol enough to make five ounces. Dose, thirty to sixty drops in warm water. Locally apply mustard to the abdomen.

Another remedy, highly prized by many, is:

Common salt	3 teaspoonfuls
Black pepper	4 teaspoonfuls
Cider vinegar	½ teacupful
Warm water	½ teacupful

Mix all together and take the whole dose, a tablespoonful at a time. If the first cupful is rejected, take another at once.

When stomach is settled take a powder composed of:

Powdered peppermint leaves	½ ounce
Powdered cloves	½ ounce
Pulverized rhubarb	1 ounce

Mix well together. Dose: One teaspoonful every thirty minutes, or less frequently after one or two doses. Hot fomentations applied to the stomach and abdomen are not out of place at any stage of cholera morbus.

Colds.—Mix ten drops of spirits of camphor with a pint of hot water. Sip the whole of it as hot as it can be taken. Avoid draughts till the free perspiration has carried the cold off. Quinine and Dover's powder; open bowels. Among other remedies the following may be mentioned: Sweet spirits of nitre and paregoric, a half teaspoonful of each for an adult, or sulphate of quinine, eight or ten grains to check; carbolized vaseline to inner surface of nostrils; if well developed inhale vapor of boiling water in which is a teaspoonful of paregoric.

Cold Feet.—Make solution of two teaspoonfuls of borax in quart of warm water, and soak feet thoroughly at bedtime, and wear woolen socks for sleeping. Bathe feet in cold water and rub dry with a rough towel. Essence of ginger, paregoric and water bag are also used to advantage.

Cold, Feverish.—At commencement a warm bath will cut short the attack, remove the aching pains and relieve the hoarseness.

Cold in Head.—Take at beginning ten drops of camphor every two hours and inhale spirits of ammonia, with warm bath at night.

This common complaint will frequently run its course and disappear in four or five days, but may be cut short by care and simple remedies.

TREATMENT.—In the first place take a saline purgative, such as a dose of Epsom salts—or a seidlitz powder. At bedtime soak the feet in hot mustard water and take ten grains of Dover's powder. Cover up warm in bed and "sweat it out." The use of quinine—say one two-grain pill every three hours, or the following, will be effective:

Phenacetin	24 grains
Quinine	24 grains
Caffeine	6 grains

Make twelve pills. One every three hours.

Colic.—Give ten to fifteen drops of asafœtida every half hour until relieved. Chamomile tea, a teaspoonful every ten or fifteen minutes. In case of children or infants give from one-half to two grains of carbonate of ammonia every hour or two until relieved and apply fomentations of all kinds or spirits of chloroform, two to five drops, with one or two drops of laudanum.

TREATMENT.—1. To relieve the pain give an injection of thin starch containing twenty to thirty drops of laudanum. To relieve the constipation give a Seidlitz powder, or a tablespoonful of castor oil, to which may be added a half teaspoonful or less of spirits of turpentine. The application of warm fomentations to the abdomen, or a mustard plaster wet with vinegar is also recommended. Soaking the feet in hot water is also of benefit. Colic is a very painful disorder, but seldom or never terminates fatally.

2. One of the best general remedies for colic, diarrhœa, pain in the stomach and bowels is the following cordial:

Gum myrrh	½ ounce
Ground nutmeg	½ ounce
Cayenne pepper	½ ounce
Good brandy or whiskey	1 quart

Pulverize the myrrh, nutmeg and pepper together; put them into a two-quart bottle; add the brandy or whiskey and cork tightly. Let it stand ten days or more, shaking frequently, then strain and bottle for use. Dose for an adult: One teaspoonful. An excellent and harmless remedy for colic, pain in the stomach and bowels, and

very useful in diarrhœa. This preparation ought to be kept in the house constantly. In using this for colic do not neglect the use of a purgative also, such as a dose of castor oil or salts.

Colic, Infantile.—Relief is sometimes afforded by stirring a teaspoonful of salt in a large glass of water and giving a teaspoonful every five minutes. It is also a good preventive of colic, sour stomach and constipation, and for such purposes should be given three or four times a day.

Colic, Painter's.—Give ten grains of alum every hour until relieved; then tablespoonful of epsom salts.

Constipation.—Drink glass of cold water before and eat orange after breakfast each morning, or five grains of ext. cascara at night, or twenty drops of the fluid extract cascara sagrada night and morning. In some cases one-sixth of a grain of belladonna at bedtime affords relief or a suppository of two grains of the extract. Two or three grains of rhubarb with a grain or two of carbonate of soda are also frequently efficacious. Salted mineral waters before breakfast are oftentimes valuable. A tablespoonful of tincture of aloes and two tablespoonfuls of soap liniment mixed and rubbed over the bowels five minutes daily is said to have beneficial results. A tea made of slippery elm taken daily in half-teacupful doses or a teaspoonful of flaxseed in cup of boiling water for few minutes and then strained.

SOAP INJECTION.—Cut a piece of yellow soap two or three inches long and of the thickness of the little finger, making the same pointed at one end. If this is introduced into the bowel and held there for a few moments it will produce a good evacuation; or make a strong soapsuds, to which add a tablespoonful of glycerine or use a glycerine suppository.

The following is well adapted for frequent or daily use in habitual constipation, but is hardly so active as the preceding:

Powdered senna	2 ounces
Powdered licorice	2 ounces
Powdered fennel	1 ounce
Flowers of sulphur	1 ounce
White sugar	6 ounces

Mix and pulverize well together. Dose: One teaspoonful in one-half glass of water well stirred up. For children, reduce the dose in proportion to age. When there are dropsical or congestive symptoms add a teaspoonful of cream tartar to each dose to stimulate the removal of the fluids from the system.

Habitual constipation is hard to cure, and calls for strict observance of dietary regulations. Coupled with a proper diet and mode of life one of the following will often affect a cure:

A good purgative biscuit is made as follows: Powdered jalap, one teaspoonful; flour, eight tablespoonfuls; sugar, twelve tablespoonfuls; powdered ginger, half teaspoonful; make twelve biscuits; one may be eaten once or twice a day according to effect desired. For children three years old and infants one-third the quantity.

Convulsions.—Epileptic.—CAUSES.—The causes of this strange disease are but imperfectly understood, and no infallible remedy has yet been disccovered.

TREATMENT.—1. Total abstinence from rich and animal food, with hygienic modes of living constitute the best defense of an epileptic patient.

2. When adults are laboring under the paroxysm little in general can be or ought to be done, except bringing the patient into the fresh air, taking off what may be around the neck and baring the chest, together with the more imperative duty of preventing the patient from doing himself any injury. If the paroxysm be prolonged greatly, the application of cold to the head may be of some service. The inhalation of ammonia or chloroform has been found useful. Internally the mixed bromides often affords relief.

Convulsions—Infantile Fits.—CAUSES.—Indigestion, worms or the irritation of teething are the usual causes of fits in childhood, or "spasms," as they are called.

TREATMENT.—1. Place the child in a warm mustard bath, say about two teaspoonfuls of mustard to one bucketful of water, and at the same time apply cold water to the head; this will relax the spasm and allow you to take steps to remove the cause of the trouble. If the child is teething and the gums are hot and swollen they should be lanced and allowed to bleed freely.

2. If indigestion or constipation seems to be the cause, give from fifteen to thirty drops of castor oil, in gruel, and an injection of warm, soapy water. Sometimes a simple emetic should be first given.

3. If you have reason to suspect that the child has worms, proceed as directed in article on worms, which see. To prevent the recurrence of the spasms the bowels must be kept reasonably free by giving small doses of castor oil daily. The warm bath, with cold water on the head, rarely fails to give instant relief from the severe and threatening symptoms. It should be applied at once, when spasm commences.

4. The following is an excellent remedy for infantile convulsions:

Chloroform	½ drachm
Bromide of potash	½ drachm
Tincture of cardamom	½ ounce
Spearmint water	2½ ounces

Shake well and give one-half teaspoonful in water to child one year old; smaller children a proportionate dose.

Corns.—Apply kerosene oil to part each night. Apply turpentine to part each night, or salicylic acid twenty grains to one-half ounce simple cerate.

Cough.—Flaxseed tea, a teaspoonful every ten or fifteen minutes. A mixture of lemon and sugar is very efficacious. Take small quantity every ten or fifteen minutes. Other remedies are: Tablets of "Brown Mixture;" syrup of ipecac; aromatic spirits of ammonia; paregoric. In chronic cough, ten grains of alum in teaspoonful of water and spray throat with same, or spray throat with wine of ipecac.

This form of a cold may originate in the throat and chest, or may be caused by the spreading downward of unchecked nasal catarrh.

TREATMENT.—1. Treatment in first stages is similar to that given for nasal catarrh (preceding) or for bronchitis, with a saline purgative. If the cough becomes troublesome use:

Muriate of ammonia	1½ drachms
Fluid extract of licorice	4 drachms
Syrup of wild cherry bark	1 ounce
Water	1½ ounces

Dose: A teaspoonful every two hours, according to severity of symptoms.

2. If the cough still continues after three or four days, make a cough mixture composed of:

Syrup of squills	6 drachms
Syrup of wild cherry	6 drachms
Heroin	⅛ grain
Cyanide of potassium	½ grain

This should be compounded by an apothecary and thoroughly mixed. Dose for adult, one teaspoonful every six hours. This mixture is very effective, but must be used with caution, as it contains ingredients which are poisonous in overdoses.

Cramps in Stomach.—Make mustard poultice, with white of egg instead of water, and apply same to bowels, and give Squibbs' Mixture. Hot water bags often afford relief. Paregoric and also laudanum relieve pain, but must be used with great caution.

Croup.—A most insidious and sometimes fatal affection if treatment is not immediately applied. Turpentine stupes applied to front of throat and breast have proved most effective, saving many lives thereby. The stupes should be made with one-third turpentine and two-thirds water, as hot as can be borne, and apply the same on flannel cloths every few moments until relief is obtained. It quickly acts upon the breathing tubes, cleaning them out, and enables the little sufferer to breathe easily, clearly and with safety. Give syrup of ipecac frequently until vomiting is produced. This condition should not be confounded with diphtheria. Other remedies are:

1. Fat bacon applied to the throat, as in sore throat, is recommended as a remedy for croup. Its action can be helped by taking internally a few drops of kerosene oil on sugar.

2. Mix a teaspoonful of alum with the white of one egg, and give a teaspoonful every few minutes until free vomiting occurs. Give one-quarter teaspoonful of syrup of ipecac every ten minutes until free vomiting occurs.

Diabetes.—In this disease there is an excessive flow of yellowish, sweet urine, with frequent calls to void it.

Treatment.—1. A tea of water-hoarhound, drunk freely, is an excellent remedy. Or, in place of the tea, a teaspoonful of the tincture may be taken four or five times a day.

2. A tea of common chickweed, drunk freely for some time, is also mentioned as an excellent remedy. Salicylate of soda in five-grain doses is most efficacious.

3. A purely milk diet, in copious quantities, has been found to result favorably.

4. One-quarter grain doses of codeine three times a day. No sugar should be used in the diet.

Diarrhœa.—Take half ounce of blackberry root and boil in pint of water about fifteen minutes, strain and give teaspoonful every hour or two until relieved; or fluid extract, dose five to ten drops in a little water; one-half to one teaspoonful of paregoric in water. Other remedies are:

1. An infusion of chamomile, prepared by steeping four to six heads of chamomile flowers in a cup of boiling water for an hour, and giving a teaspoonful hourly. Avoid solid food until bowels are all right.

2. Tablets of chalk mixture, of subnitrate of bismuth, or of pepsin; paregoric, laudanum.

3. Give starch injection with half a teaspoonful of laudanum for

adult; for child only a few drops, and one drop of the wine of ipecac every hour, especially if vomiting be present, or half a grain of gray powder (mercury and chalk) every hour or two.

4. A good blackberry cordial, such as the following, is often found to be a preventive and specific for summer complaint, diarrhœa, etc.:

Ripe blackberries ..... 2 quarts
Sugar, white ..... 1 pound
Cloves and allspice .....½ ounce of each

Boil all together. When cold, press out and strain the juice and add a pint of good brandy. This makes a pleasant drink, and may be taken in quantities from a teaspoonful to a wineglassful every two to four hours. Be careful not to take too much astringent medicine and thereby check the diarrhœa too suddenly.

Diphtheria.—Spray the throat with peroxide of hydrogen. Give small doses of calomel repeated. Call a physician and use antitoxin.

Dropsy.—Make a tea or infusion of half an ounce of skull cap root to one quart of water, and boil to pint. Take wineglass of same three or four times a day. Or the same quantity of grapevine root, made in same manner, and taken as above. Bascham's Mixture, dessertspoonful three times a day.

The following prescription has been found of value:

Fluid Extract Digitalis.....20 drops
Fluid Extract Belladonna .....30 drops
Fluid Extract Buchu.....1 ounce
Dose: Four drops in water every four hours.

Dysentery.—Take an ounce of dewberry root and boil in quart of water to one pint, and give half wineglass of same every two or three hours until discharges diminish. Ten grains of subnitrate of bismuth frequently. See Diarrhœa.

Dyspepsia.—Small doses bicarbonate soda before meals and do not eat any fried food. Pepsin tablets. Three grains of bismuth, with five grains of charcoal, to be taken before meals, and three grains pepsin in a little water after meals. Half teaspoonful of compound tincture cinchona, with five drops tincture of nux vomica in a little water, taken three times a day, is very beneficial.

Dizziness.—Give five drops of tincture of gelsemium four times a day.

Earache—Inflammation of the Ear.—TREATMENT.—1. Beware of injections into the ear, or the use of any and all instruments. Either of the preparations here described will almost surely give relief:

2. A drop or two of chloroform on cotton and placed in the ear and heat applied.

Sweet oil ..... 2 teaspoonfuls
Laudanum ..... 1 teaspoonful

Mix. Lie with head resting on the side opposite the inflamed ear, and drop from a warm teaspoon from four to six drops of this mixture into the affected ear; then stop with cotton.

3. Another, equally good, is:

Onion juice ..... 2 teaspoonfuls
Sweet oil ..... 2 teaspoonfuls
Laudanum ..... 1 teaspoonful

Mix and use as above directed. Be sure to apply warm, not below blood heat. To get the onion juice, roast one or two large onions and press out the juice. It is a good plan to soak the feet in hot water and take an active cathartic if bowels are in the least constipated.

Eczema.—1. Chronic eczema (skin disease) may be treated successfully by an ointment of pitch and turpentine melted together; an ounce of each. Add an ounce of vaseline and two drachms of red precipitate. Mix all well and apply as a salve, or ichthyol and zinc ointment.

2. A good eczema wash is made of an ounce each of bruised blood root and yellow dock, steeped well in a pint of alcohol and half pint of vinegar.

3. A paste of sulphur and lard applied to the affected skin morning and evening is recommended as a good eczema cure.

4. Apply ichthyol, one drachm; zinc ointment, one ounce. If itching ten drops of carbolic acid can be added. A cold potato poultice, with a small quantity of camphor, has proven most beneficial.

Enlarged Spleen.—Give quinine and the tincture of the chloride of iron—one-half grain of quinine and ten drops of the tincture of iron—three times a day, and apply morning and night over the enlargement the compound iodine ointment.

Erysipelas.—Put about a tablespoonful of baking soda in one pint of water and bathe parts several times a day. Keep parts well bathed with witch hazel. Other remedies are:

1. Boil white navy beans, mash and add cornmeal to make poultice. Apply hot and change frequently.

2. A wash containing two parts of borax to five of water is effectual in subduing inflammation; also an ointment of three grains of morphine, two drachms of green vitriol and one ounce of lard, applied several times a day. Tincture iron along the margin to prevent spreading.

3. Take one teaspoonful of following mixture every two hours: One ounce each of glycerine, chloroform and tincture of iron.

4. Give five drops tincture of aconite every hour at commencement. Add a teaspoonful of tincture of digitalis to half a pint of boiling water, and apply by means of flannels wrung out of the decoction to parts.

Exposure to Cold.—See Frost Bites.

Fainting.—Aromatic spirits of ammonia; whiskey; keep head low, have clothing around neck and waist loose, and give plenty of fresh air. Sprinkle face with cold water.

Falling of Palate or Uvula.——Make a strong decoction of white oak bark, and use as a gargle several times a day.

Felons.—These painful inflammations usually occur on the fingers or hands. They are seated at the bone and begin with throbbing pain and great soreness and inflammation.

Treatment.—1. A good drawing poultice is made of brown soap and unslacked lime, into which a little alcohol has been introduced.

2. The white of an egg and salt make an application which sometimes serves to scatter the inflammation, or bread and milk poultice.

3. Immerse the afflicted finger or hand in hot water frequently.

4. Mix thoroughly half teaspoonful of powdered camphor and one egg and apply two or three times a day.

Fever, Simple.—Give about half a teaspoonful of sweet spirits of nitre in a little sweetened water every two or three hours for an adult, and smaller quantity to child, in proportion to age. Keep bowels well open with simple purgative. Ascertain temperature by clinical thermometer. 98.6 degrees is normal; 99 to 101, slight fever; above this marked fever. Bathe with alcohol and water.

Fever and Ague.—Make an infusion of one ounce of dogwood root boiled in one quart of water to one pint; strain and give half wineglassful every two or three hours. Quinine in liberal doses.

Fever Sores.—Make a decoction of clover blossoms, and apply to parts three or four times a day. Half ounce of clover blossoms to one pint of water, and boil about half an hour. Apply spirits camphor.

Fistula.—Use as an injection a solution of witch hazel, diluted with water.

Freckles.—TREATMENT.—Freckles are sometimes removable and sometimes not. The following lotions are as good as any:

Rain water ..... 8 ounces
Borax ..... ½ ounce
Mix and dissolve; wash part twice daily.

Rose water ..... 4 ounces
Alcohol ..... ½ ounce
Hydrochloric acid ..... ½ drachm
Mix and apply with sponge or rag three times daily. Painting with tincture of iodine is sometimes effective. Generally speaking, it is best to leave the freckles alone.

Frost Bites, Frozen Limbs, etc.—In severe winter weather any exposed or insufficiently clad part of the body is liable to become frozen, and this is especially likely with the extremities such as nose, ears, fingers, toes, etc. The parts first become blue, then purple and then white and stiff. When solidly frozen the part becomes as hard as stone and at the same time is very brittle so that, for instance, were you to strike a solidly frozen ear, it would break off. Freezing is apt to occur without the victim being aware of the fact. It may usually be prevented by rubbing any part which feels very cold, as this brings warm blood to the surface. The danger is when after being cold the part suddenly has no feeling. The object of treatment is to gradually restore circulation to the congealed part. Application of snow or cold water to the frozen part, gently rubbing and pinching it, is the most common method of restoration, but care must be taken in severe cases to do this so gently as not to break off any brittle part. Under no circumstances should dry heat be applied nor hot water, as either of these methods is apt to cause mortification of the frozen part; but it is now recognized that the most efficacious treatment is that of commencing the thawing process with water that is merely warm and then gradually as the thawing takes place making the water warmer until it is as hot as may be borne. (See General Index for full discussion of this condition.)

Gall Stones.—Drink about one wineglassful of sweet oil at bedtime, followed in morning by cathartic, as seidlitz powder or cream of tartar, and phosphate of soda, teaspoonful each morning in wineglassful of water. This treatment to be pursued several weeks. Massage the part over the region of the liver lightly night and morning. Gall stones being very painful and dangerous, it would be well to consult Liver Colic. During

attack ten grains of chloral every two or three hours until relieved, or tablespoonful of olive oil every two or three hours until relieved. Apply warm fomentations to seat of pain.

Giddiness—Vertigo.—This is a symptom rather than a disease, and generally arises from a disordered stomach or (in women) a derangement of the menstrual functions. Ordinarily a good purgative, or sometimes an emetic, with hot foot-baths, will remedy the trouble.

Glands, Enlarged.—Apply iodine ointment and give internally three grains of sulphide of calcium three times a day.

Gleet.—To one ounce of Port wine add about ten grains of tannin, and use as an injection three or four times a day, or pills Copa-Kava.

Goitre.—Apply the following several times a day: Extract of belladonna, half drachm; compound ointment of iodine; two drachms; vaseline, half ounce, or iodine peptogen. This treatment must be kept up for several months.

Gonorrhea.—Treatment.—1. This should be chiefly by injection into the urethra, and probably the best, especially for the earlier stages, is the following:

Fluid extract hydrastis	1 ounce
Distilled water	6 ounces
Gum arabic, pulverized	2 drachms

Mix and inject with proper syringe three or four times daily.

2. Internally give pills of Copa-Kava.

3. Observe care as to diet and so forth. Should the disease run into the chronic form, known as "gleet," we recommend the following injection:

Sulphate of zinc	10 grains
Sugar of lead	15 grains
Water	4 ounces

Gravel.—1. Treatment of gravel in the acute form comprises the warm bath, suppositories of a grain of opium and one-sixth of a grain of belladonna, flaxseed tea, and the use of salty purgatives.

2. In chronic gravel tea or fluid extracts of buchu are often used, and in stubborn cases five-drop doses of diluted nitromuriatic acid, or salicin in five-grain doses, thrice daily, may be given.

3. Some recommend onion juice for gravel, in doses of a wineglassful morning and evening.

4. Relief is sometimes had from a mixture of two teaspoonfuls of powdered borax and five of cream of tartar, dissolved in a pint of water, the dose being two or three dessertspoonfuls four times a day.

5. The juice of the garden beet, boiled to a syrup, and taken two to three times a day in doses of a wineglassful, is said to have valuable curative efficacy.

6. To one teaspoonful of powdered borax add about two tablespoonfuls of cream of tartar and one pint of water; of this mixture take four teaspoonfuls four or five times a day; also give ten grains of the bicarbonate of potash three times a day to dissolve the calculi. Use water freely. See General Index for full article on Stone in Bladder (Calculus).

7. Boil turnips, pour off the water into a jar and drink a cupful four times a day.

Auxiliary Treatment.—A palliative of the spasm of pain is a warm bath or a wrapping of the patient in a blanket saturated with hot water. Keep the blanket hot by frequent applications of the water.

Hay Fever.—If much irritation of eyes and nostrils, inject into nostrils, three or four times a day, a mixture composed of ten grains of sulphate of zinc, half teaspoonful of borax, and about four ounces of rose-water or use adnephrin in atomizer. A solution of cocaine with atomizer is useful; also in the inhalation of spirits of camphor; also spraying the throat with wine of ipecac.

Headache.—Seidlitz powder; tablets of bromide of potash; aromatic spirits of ammonia; elixir of valerianate of ammonia; alcohol locally.

Or two drops tincture of belladonna every hour or two. Hot sponge face, temples and neck. Bathe forehead with spirits of camphor and cologne. Apply mustard leaf to nape of neck, or cayenne pepper plaster. Five grains of carbonate of soda every two or three hours.

This is generally a symptom of some other disorder, and can be relieved only by curing the primary trouble. There are five distinct kinds of headache, which may be described as follows:

Sick Headache.—This is caused by some derangement of the stomach and liver and is apt to occur more or less regularly at intervals of two or four weeks. It is a most distressing form of the malady. The pain is often confined to the temples, or is most severe there; occasionally the back of the head seems most affected. There is really no trouble in the head; it is all in the digestive tract. The following method of treatment will usually cure:

Treatment.—Soak the feet in hot water containing a handful of

either mustard or salt; at the same time give an emetic, such as two teaspoonfuls of wine of ipecac; or an infusion of lobelia (made by steeping two teaspoonfuls of the powdered leaves for twenty minutes in a half pint of boiling water). Before taking this emetic, it is well to drink a half-pint or pint of some warm tea, like sage or pennyroyal. When free vomiting has occurred, give patient a little gruel and let him rest in bed for two or three hours. Then give an active cathartic.

Auxiliary Treatment.—Keep the bowels open by giving one or two cathartic pills every night for several days. Bathing the whole body with weak saleratus water often affords relief, in conjunction with this treatment; also applications of cold water to the head when the heat is intense.

Nervous Headache.—This form of headache denotes a weak, debilitated condition of the nervous system, caused by long-continued illness, loss of blood, unwonted mental excitement, etc. There is more or less stupidity and confusion of ideas, sometimes dimness of vision, and a dull pain in the head.

Treatment.—1. The treatment is directed to toning up the system. Have the following prescription prepared by an apothecary:

Extract of valerian	15 grains
Sulphate quinine	10 grains
Extract hyoscyamus	15 grains
Cayenne pepper	5 grains

Make into 15 pills and take one pill three times a day.

2. In addition to this, it is advisable to get:

Tincture of bloodroot	1 ounce
Muriated tincture of iron	1 ounce

Mix. Take ten drops in a gill of water three times a day. This adds tone and strength to the blood.

Or ten to fifteen grain doses of bromide of potassium in water.

Rheumatic and Sympathetic Headache.—In cases of fever of any kind the heated blood passing through the brain gives rise to pains in the head that may be relieved somewhat by the application of cold water or cracked ice, but cannot be cured without removing the primary trouble. Disease of the kidneys gives rise to headache, caused by insufficient elimination of the uric acid; women often suffer from headache during pregnancy.

Treatment.—These forms of the malady can only be relieved by

cooling the head, as above directed. When a person is suffering from rheumatism, it sometimes seems as if the pain jumps from the affected part to the head and back again at intervals. In such cases the employment of remedies for the original trouble is required.

Chronic Headache.—Sometimes there appears a chronic form of headache, originating, perhaps, in some severe spell of sickness and persisting in spite of all remedies. This form is likely to affect some one part of the head, and whilst it may vary in intensity, is seldom entirely absent.

Treatment.—The treatment consists of laxative medicines to keep the bowels always free, but without violent purging. Keep the feet warm and the circulation equalized. Diet must be plain and nourishing. A certain form of chronic headache sometimes accompanies catarrh, and is relieved only by curing the catarrh. As a good general rule—keep the feet warm, the head cool, the skin clean and the bowels open.

Plethoric Headache.—This type of headache most affects persons of full habit, and is caused by too great flow of blood to the brain. It can easily be recognized; stooping down and then raising the head gives a sense of fullness and pain; suddenly jarring or shaking the head aggravates the pain; blowing or straining, or pressure on the neck gives rise to pain, with more or less giddiness. Sometimes the excess of blood in the brain indicates an over-supply all through the body; in other cases it is caused by a derangement of the circulation, other parts of the body suffering from an insufficient amount of blood. In the latter case the extremities will be cold, while the head is flushed and hot, with severe throbbing sensations.

Treatment.—In such cases the feet and legs must be soaked in hot mustard water, with a sprinkling of cayenne pepper, and thoroughly rubbed with a coarse towel. Give an active hydragogue cathartic and repeat every three days, if necessary, until complete relief is obtained.

Diet.—Diet should be light and unstimulating—fruits, oatmeal porridge, etc.

Heart.—When violent and throbbing, two drops of aconite tincture every half hour until relieved. Mustard plaster over heart, also to neck. When very weak from accident, fright, loss of blood, etc., brandy and wine. Nitrite of amyl, five drops placed on handkerchief, and inhaled a few minutes. Large poultice applied to heart region. Hot applications to calves of legs and soles of feet.

Heartburn.—Give five drops of the tincture of nux vomica half an hour before each meal.

Heart-Failure.—Aromatic spirits of ammonia; whiskey; hot water bag and mustard plasters to extremities; if they are cold treat as in fainting.

A mixture of one-half ounce of the fluid extract of digitalis and one-half ounce of the fluid extract of Stramonium given in doses of three drops every four hours, has been found of value.

Heatstroke or Sunstroke.—This is induced by exposure to excessive heat, either with or without direct rays of the sun. There are certain general symptoms of its oncoming which should serve as a warning—headache, a sense of weakness at the pit of the stomach, a weakness of the knees, dizziness and sometimes vomiting and disturbed vision. These symptoms may gradually merge into unconsciousness or without warning the stricken one may suddenly collapse and lie insensible. A characteristic condition is the intense, burning dry heat of the face, head and body. The face itself becomes red and flushed; the pulse is full and rapid; convulsive twitchings of various parts of the body are frequently observed.

Treatment.—Endeavor at once to reduce the heat of the body. Undress the patient, wrap the body in a sheet and keep the sheet wet with cold water by frequent sprinkling. Continue this until consciousness returns and the body feels cool. If after becoming conscious the patient relapses into unconsciousness, the cold water process must be repeated. If impossible to immediately follow the above treatment, then wring out cloths in ice water, or coldest to be had, and place them on the head, back of the neck and around the wrists.

Hemorrhage, Nose.—A strong solution of alum or the powder sniffed up the nostrils. Compress the facial artery of the upper jaw near the nose. Apply ice bag to spine, upper part of neck, and give one drop tincture of aconite every hour.

Hemorrhage, Lungs.—Give half a teaspoonful of common salt every hour or two until hemorrhage abates unless nausea be produced. Five to ten drops of turpentine may be given in sweetened water every two hours. Fluid extract of ergot is also indicated. Apply ice bag to spine, middle part of back and lower part of neck. Perfect rest is essential. Ice should be sucked constantly.

Hemorrhage, Stomach.—Ice to be constantly sucked. Give two drops of the tincture of witch hazel every two or three hours. Perfect rest.

Hemorrhage, After Childbirth.—Insert pieces of ice into the vagina and rectum, also inject into vagina four ounces of the perchloride of iron

with twelve ounces of water, and give ten drops fluid extract of ergot every two hours.

Hiccoughs.—Put about quarter of a teaspoonful of cinchona bark, powdered, in two ounces of peppermint water, and give a teaspoonful every five or ten minutes till relieved; or a teaspoonful of mustard in four ounces of boiling water, taken when cool; or three drops each tincture camphor and aqua ammonia in wineglass of water.

Hives—Causes.—These irritating visitations, generally upon children, are mostly due to indigestion, or partaking of certain disagreeing foods, or extremes of heat and cold.

Treatment.—1. To allay itching, rub with flour; buckwheat is the best.

2. Sassafras or saffron tea is a good internal remedy, since it promotes perspiration and lessens irritation.

3. Bathing with diluted vinegar is a good treatment.

4. Small doses of salts three times a day.

5. Locally carbolic acid, twenty drops to a pint of water, or a tablespoonful of baking soda to a pint of water.

Hoarseness.—A mixture of scraped horseradish, with a small proportion of wheaten flour, use of this a small quantity several times a day. Or the juice of one lemon, with sufficient sugar to saturate, and take teaspoonful of same several times a day, or a small piece of borax dissolved in mouth and swallowed slowly, or chloride of ammonia in five-grain doses.

Hysteria.—Elixir of valerianate of ammonia.

Incontinence of Urine, "Bed Wetting."—Ten drops tincture belladonna three times a day. The child should drink but little some hours before going to bed, and should be wakened in the middle of the night to pass water.

Indigestion.—An exclusive diet of fruit for several days is found efficacious in most cases of indigestion. This diet is excellent in dyspepsia and constipation.

Indigestion, Acute.—Dyspepsia, heartburn, a functional derangement of the stomach with pain, a sense of distension and gas, regurgitation of food, headache, and frequently perspiration. Regulation of the diet is of great importance, and for the acute symptoms bismuth 10 to 20 grains, essence of peppermint, one-half teaspoonful in water, bicarbonate of soda, and if pain is severe one or two teaspoonfuls of

paregoric in hot water. The after treatment consist in keeping the bowels open and you may take the following:

Subnitrate of bismuth	2½	drachms
Fluid extract cascara	4	drachms
Compound tincture cardamom	6	drachms
Glycerine	4	drachms
Peppermint water	4	ounces

Inflammation of Bladder.—Make an infusion of pipsissewa root, one ounce to pint of boiling water, and give wineglassful three or four times a day. Keep parts well warm with poultices, and so forth, over bladder. Drink plentifully of hop tea, which is an excellent remedy; also an infusion of cubebs and buchu.

Inflammation of the Bowels.—Make poultice of flaxseed meal, and put on surface a mixture of equal parts of tincture of aconite root and laudanum, and apply to bowels, changing same every three hours. Perfect quiet. Give no cathartics. Mucilaginous drinks: Gum arabic water, toast water, and so forth.

Inflammation of Stomach.—Make decoction of hops or stramonium leaves, of either one ounce to pint of boiling water, and foment stomach and bowels several times a day. Apply mustard plaster.

Inhalation of Noxious Vapors.—Remove patient from influence; place in open air; put two tablespoonfuls of turpentine in quart of boiling water and inhale vapor to counteract the deleterious effects of the poisonous gas.

Insomnia.—On going to bed, take some sound, as a clock-tick or the breathing of some one within hearing, and breathe long full breaths, keeping time to the sound. In a very short time you will fall asleep, without any of the painful anxieties attending insomnia. Endeavor to relax the body.

Itch.—Apply sulphur ointment once a day for four days. See Scabies.

Itching of Anus.—Make a solution of ten grains of borax to the ounce of hot water and apply freely to the anus, or apply ten drops of carbolic acid to a pint of water.

Itching of the Skin.—Dust parts with mixture of equal parts borax, camphor and bismuth.

Jaundice.—In attacks lasting three or four days, take one-third grain of gray powder (mercury and chalk) three or four times a day for three days, then take a seidlitz powder, or take twenty drops nitro-muriatic acid in wineglassful of water three times a day.

Treatment.—1. The treatment is directed to cleaning up the bile duct, and forcing the bile into its proper channel. Probably the best remedy is this: Take a two-grain blue-mass pill twice daily for two or three days in succession—not longer. This is better than taking a larger dose once a day. If relief comes after one or two doses, take no more.

2. As a substitute for this, the following purely vegetable pills can be substituted, and often with equal success:

Extract taraxacum	40 grains
Podophyllin	4 grains
Leptandrin	10 grains

Make into twenty pills. Dose: One pill four times a day.

Or 3. Phosphate of soda daily before breakfast.

Kidney Disease.—Make decoction of sheep-sorrel, one ounce to pint; boil, strain and cool. Give wineglassful three or four times a day. Or the same quantity of buchu leaves, made in same manner, and dose the same, and apply the spinal ice bag to kidneys. Have urine examined. Spirits of sweet nitre is indicated to promote action.

Kidney Troubles.—Saltpeter (nitrate of potash) in small doses increases the flow of urine and in some cases increases perspiration. In large doses it acts as a purge and irritates the stomach.

La Grippe.—1. Small pills made of asafœtida, and taken three times a day are recommended as a remedy for the grippe. Actea racemosa has been used with great success in doses of twenty drops of the tincture every three or four hours, or phenacetin and quinine in two-grain doses of each every four hours.

2. Some use a tea of red pepper, or of cayenne, with great success. The dose is a teaspoonful in a cup of hot water, drunk slowly, before each meal and on retiring. Larger doses in proportion to the intensity of the disease. Sponging the face, temples and neck with water as hot as can be borne relieves the headache of grippe.

Lead Colic.—Bicarbonate of magnesia, fifteen to twenty grains three times a day, or iodide of potash, three grains every three hours.

Causes.—This is about the worst form of colic, and is attended by obstinate constipation, most violent pains and more or less paralysis of the bowels and abdominal muscles. It is generally caused by inhaling the fumes arising from various preparations of lead, and the most frequent victims are painters and leadworkers.

Symptoms.—The attack generally comes on gradually, the pain be-

ginning in the stomach and slowly extending downward. After a time the distress seems centered about the navel, and, in severe cases, there are shooting pains through the abdomen, with spasms of the intestines and abdominal muscles. Nausea is usually present, there is some vomiting, thirst, anxiety; the countenance is pale and contracted with pain; pulse is rapid; abdomen may become knotted and sore to the touch; the bowels seem paralyzed and incapable of expelling their contents. Unless relief is obtained inflammation of the bowels will occur, and death is almost certain.

TREATMENT.—1. The first thing to be done is to relieve the constipation by means of an active purgative, such as three to five of the antibilious pills (see Bilious Fever), and the application of hot fomentations over the whole abdomen. To relieve the spasm give an injection composed of:

Thin boiled starch ..... 2 tablespoonfuls
Laudanum .....30 to 40 drops

Hypodermic injections of about one-eighth grain of morphia are also useful, but can be administered only by a physician.

2. In extreme cases, when the cathartic does not act promptly, it is sometimes advisable to give from two to four drops of croton oil, on lump sugar; but this is a dangerous drug in the hands of any one except a physician.

Leucorrhea or Whites.—1. Alum, teaspoonful to pint of water as injection or teaspoonful of carbonate of soda, two ounces tincture belladonna, one pint of water, and give tincture chloride or iron, ten drops, three times a day.

2. A decoction of white oak bark, used as an injection twice daily, is found very beneficial. Ounce of the bark to a pint of water.

3. Cleanse the parts effectually with warm water by means of an injection. Then inject a full syringe of a mixture made by dropping a tablespoonful of extract of witch hazel into warm water.

4. Yarrow-root tea, in doses of a teacupful three times a day, gives effectual relief.

5. The Tri-Septic Douche Tablet is recommended.

6. Blackberry tea is valuable as an enema.

7. Oregon grape root has been highly recommended as a cure. Make a strong decoction by boiling an ounce of the root in a pint and a half of water down to one pint and take a wineglassful four times a day.

If the root cannot be obtained ask your druggist for *Berberis Aquafolium,* which is the Latin name of the Oregon Wild Grape Root. Of this fluid extract take one-half teaspoonful in water three times a day, and also put one teaspoonful in a cup of tepid water and use as a vaginal douche. Lie flat on the back in taking douche.

Liver Complaint.—Make infusion of dandelion tea, one ounce to one pint of boiling water, strain and cool, and give wineglassful morning and evening. Or use from one to three grains of may apple night and morning for several weeks, followed occasionally by a light purgative, as seidlitz powder or rochelle salts, or a laxative liver pill at night.

Lockjaw.—Apply a warm poultice of flaxseed meal, saturated with laudanum and sugar of lead water, to the jaws and neck. Consult physician at once.

Loins, Pains in.—Apply belladonna or capsicum plaster to small of back; also useful when pain is due to uterine diseases or piles.

Lumbago.—A mixture of ice and salt applied to small of back, or back to be ironed, a piece of brown paper intervening. Give five grains saltpetre every two hours, or turpentine in fifteen-drop doses every three hours. Apply poultices very hot, then cover skin with flannel and oiled silk.

Malaria.—Give one grain of quinine every three hours for several days; then five drops of Fowler's solution three times a day for about two weeks. Tablets of sulphate of quinine, preceded by small doses of syrup of ipecac to stimulate liver, may be administered, and seidlitz powders given as a laxative.

Measles.—Give two drops tincture of aconite every two hours, after carbonate of ammonia every three hours. Rub hands and feet with fat to remove heat and tightness produced by rash. Keep child in dark room. Warm mustard bath if rash recedes. Give nitre water as drink.

Melancholia.—Use a pill composed of about three grains of asafetida three or four times a day; change of scene; bright surroundings, and so forth, or one grain of musk three or four times a day.

Membranous Croup.—Give the patient a warm bath. Put a small piece of quicklime in a little water in a pitcher and place it so that the patient can breathe the fumes. Do this at quarter-hour intervals. The inhalation of the fumes from a cloth saturated with a mixture of salt and vinegar is said to be equally effectual. Consult a physician at once and use antitoxin.

Menses, Suppressed.—1. The juice of the common beet has been found

to be an excellent remedy for suppressed or tardy menses. Boil the beets until thoroughly done, then remove the beets and boil the juicy water again until it assumes the form of a syrup. Take a cupful three or four times a day.

2. Hot sitz bath with mustard a few days before the period. Ice applied to the lower portion of the spine increases the amount of blood supplied to the pelvic organs and restores the monthly flow.

Menstruation, Excessive.—1. The juice of one lemon taken three times daily will stop excessive menstruation when all other remedies fail, and regulate the system preparatory to the next flow.

2. Tea of comfrey root boiled in sweet milk and drunk in half-teacupful quantities three times daily will check menses when too profuse. Sucking the juice of one of two lemons is a valuable remedy for excessive menstrual flow, or the pill uter-ova, one three times a day.

Mumps.—Keep jaws warm with poultices or fomentations, and give half grain of gray powder every two or three hours to hasten the reduction of swelling.

Treatment.—Nothing is needed beyond rest and proper care, except an occasional dose of salts, or, if the pain is very severe, the application of a poultice, made from mullein leaves, with a sprinkling of laudanum or camphorated oil.

Nausea or Sick Stomach.—Drink a teacup of warm water every few minutes until free vomiting takes place, and apply a small mustard plaster, made with the white of egg instead of vinegar or water, to the pit of stomach, allowing same to remain an hour or two, as no blister will occur. Give cracked ice and fifteen drops aromatic spirits of ammonia.

Nervous Headache.—See Headache.

Nervousness.—Three grains bromide of potash every three or four hours, or elixir valerianate of ammonia, half teaspoonful every three or four hours.

Nettle Rash.—Make a strong solution of common baking soda, about three teaspoonfuls to pint of water, and sponge or bathe body thoroughly.

Neuralgia.—An affection of the nerves, causing at times most excruciating pain and suffering. Cold is its most frequent cause, although it may sometimes arise from disease of the sheath or covering of the nerves. Its most frequent seat is in the fifth pair of nerves which supplies the head, face, arms and so forth. A quick method of alleviating the same is to make pressure upon this nerve at its origin, just over and below the temple. Great relief is obtained by warm fomentations, especially one

made from the leaves of the eucalyptus plant. The fomentation is made by adding about one and a half ounces of the leaves to a pint of hot water, and apply fomentations of the same to part until relief is obtained. Internally the pill acetanilide comp. or gross neuralgia pill will relieve.

Equal parts of tincture of belladonna, tincture of aconite root and laudanum applied to part affected, several times a day. Or make mixture of one teaspoonful of common black pepper, the yolk of one egg, make plaster and apply; renew if necessary.

Neuralgia (of Face).—Use aconite liniment, care being taken that it does not enter the eyes. An infusion of capsicum pods, one handful to a pint of warm water, and applied on lint is most efficacious. Internally pill acetanilide comp.

Night sweats.—Make a strong infusion of sage tea, and use a tablespoonful three times a day, with double dose at bedtime. Sponging body before retiring with alum or borax water often checks same, and induces refreshing sleep. Apply belladonna ointment at night to chest, or tr. belladonna internally.

Nipples, Sore.—Alum to harden nipples, or brandy and water, and washed off before child nurses. If cracked, apply glycerine with starch, or arnica ointment.

Offensive Breath.—Teaspoonful each of powdered myrrh and camphor and put in pint of water; use as a wash for mouth. Look for the trouble in the teeth.

Painters' Colic.—Give patient a free purge of cream of tartar, about tablespoonful in a glass of water, and apply warmth to stomach and bowels.

Palpitation of Heart.—Make an infusion of geranium root, half ounce in pint of boiling water; strain and cool and give wineglassful three or four times a day. Rest. Another treatment is to give two grains camphor every two or three hours, or two drops aconite every hour. Place feet in hot mustard bath.

Peritonitis.—Apply turpentine stupes to abdomen. Cover abdomen with large poultice.

Perspiration—To Remove Odor.—A frequent source of vexation to ladies and gentlemen is the unpleasant odor arising from perspiration. This may be entirely removed by adding one or two tablespoonfuls of hartshorn (spirits of ammonia) to each gallon of water used for bathing. Its excessive use, however, is not recommended, although no serious trouble can arise from it.

Piles.—Symptoms.—They consist of little tumors which form at the

edge, or just inside of the fundament, and give rise to intense pain, especially during evacuation. Very often their surfaces exude blood, in which case they are called "bleeding piles." When seated at the edge of the fundament they are not apt to bleed, and are called "blind piles."

TREATMENT.—1. When small, an ointment of ten grains of extract of belladonna, thirty grains of tannin, and twenty grains of powdered opium, will generally relieve them. When large, protruding and very stubborn and painful, apply a solution of cocaine to the parts affected. Then gently press the tumors back into the rectum. The swelling will gradually diminish and the pain subside; or apply hot witch hazel.

2. A strong solution of salt injected two or three times a day has been found efficacious. The solution is to be weakened to suit the conditions of each particular case. Inject half a pint of cold water before going to stool each day.

3. Some recommend the simple extract of Canada Pine (Pinus Canadensis) as a cure. It is applied by rubbing it on with the finger, two or three times a day.

4. Calomel, half a teaspoonful, well beaten into lard, and used as an ointment, two or three times daily, is spoken of as an excellent cure.

5. In some places cranberry juice is said to be used with good effect. It is used in the ordinary cooked form and eaten freely as a sauce.

6. An ointment of white lead and linseed oil, well mixed and applied twice a day, has produced some very effectual and rapid cures.

7. An ointment of tannin and glycerine, well mixed and applied once or twice a day, is a favorite remedy with some medical men.

8. Smartweed root, about half an ounce, boiled with two ounces of lard, and apply to piles three or four times a day; or a warm application of witch hazel.

9. A cold water injection of about one-half a pint every morning before going to stool cures in many instances. In bleeding piles use injection of witch-hazel. Rhubarb is most efficacious, a piece of about ten grains to be chewed or dissolved in the mouth nightly; or apply the following ointment: Carbonate lead, one-half drachm; tannin, twenty grains; ceratum, one ounce.

AUXILIARY TREATMENT.—Avoid all liquors, tea, coffee and highly spiced foods. Take exercise. Bathe the parts frequently with cold water. Injections for the purpose of securing easy stool are of benefit.

Pleurisy.—Make a decoction of prickly ash bark, one ounce to one pint of boiling water; cool and strain and give tablespoonful about four

times a day, and apply poultices hot as can be borne, or spirits turpentine and sweet oil locally. Another internal treatment is the administration of two drops of tincture of aconite every hour.

Pneumonia.—Give two drops tincture belladonna every hour. Apply hot mustard poultice to chest, or pack the chest with cloths wrung out of ice water, and renewed every hour.

A poultice made of flaxseed meal, vinegar and onions placed across the chest and under the armpits has proven very succesful in some cases. The onions should be thoroughly boiled before using. Under no circumstances permit the poultice to become cold. It must be carefully watched and renewed before it becomes cool.

Polypus.—Apply powdered poke root several times a day. This treatment must be pursued for some weeks, or have them removed by physician.

Proud Flesh.—Apply to part powdered burnt alum until the flesh is entirely removed.

Putrid Sore Throat.—Make strong decoction of white oak bark, one ounce to pint, and use as a gargle several times a day, or a solution of borax, one drachm to one-half pint of water, or apply equal parts of iron and glycerine to the throat.

Quinsy.—In inflamed tonsils, when they almost meet, mercury and chalk (gray powder), the third of a grain every hour, acts like magic. Cold compress used nightly to harden throat. Early 10-drop dose ammoniated tincture of guaiaci.

Rheumatism.—1. Make use of lemon juice freely. Use decoction of black snakeroot, one ounce to pint of boiling water; a tablespoonful four times a day. Wet cold compress, renewed every two hours, applied to painful joints, or oil of wintergreen. Wrap the parts in cotton.

2. Among the many remedies found effective in rheumatism is rochelle salts. Dissolve a dessertspoonful in water and take every two hours. After twelve hours take once in four hours or five-grain doses salicylate of soda every four hours.

3. Acid steam bath is most effective. Cold, wet compress applied to painful joints. The bicarbonate and citrate of potash in doses of five grains each three or four times a day. Drink freely of lemonade, or apply locally oil of wintergreen and cover with cotton.

4. **Baking Cure.**—The application of hot, dry air as a therapeutic agent is regularly practiced in an increasing number of cases of gout, rheumatism, inflammation, obesity, ænemia, and all forms of pain. The patient is placed in a specially devised oven which covers the entire

body except the head, and it is said that a temperature of 400 degrees Fahrenheit can be borne without danger. Sips of cold water are given during the process. It is claimed that persons have been able to walk after years of affliction with deforming rheumatism, and in certain cases chronic forms of disease have been cured. The treatment can be applied to an affected joint or the hand or foot.

Rheumatism, Muscular.—Bicarbonate of soda; camphorated soap liniment and hot water bag.

Ring-Worm.—Make a strong solution of tobacco leaves, and apply to part until it entirely disappears, or use ointment of oleate of copper.

Rupture.—Make poultice of lobelia and stramonium leaves, equal parts, and apply to part; renewing as often as necessary. In the reduction of hernia the use of chloroform is obvious. Consult physician at once.

Salivation.—Use as a wash for mouth mixture composed of the tincture of cinchona, four ounces; borax, one drachm; water, six ounces. Wash mouth thoroughly several times a day.

Salt Rheum.—Use an astringent wash as alum, tablespoonful in pint of water, and keep bowels opened by cooling medicines, as cream of tartar, rochelle salts and so forth.

Scabies (Itch).—The patient is to take a hot bath every second evening, after which freely apply the following ointment before retiring. It is of importance that, after the disease has been cured, the clothing should be exposed to a heat of 212° F. in order to destroy any parasites which may adhere to them and thus prevent renewal of the affection.

Betanaphthol	20 grains
Sulphur	1 drachm
Peruvian balsam	1 drachm
Oxide of zinc	1 ounce

Make an ointment and apply twice daily to affected parts.

Scalds.—See *Burns.*

Sciatica.—As this is a form of neuralgia, the treatment should be by means of the following:

Sulphate quinine	1 grain
Phosphate iron	2 grains
Strychnine	1-50 grain

Have fifty of these pills made; take one after each meal. Specially useful in neuralgia and rheumatism, with good results.

The use of these tonics will tend toward a cure, but the disease is very obstinate, and strict observance of hygienic precautions is imperative. In this disease, as in lumbago, the use of belladonna plasters, which may be bought at any drug store, often contribute to relieve the intense pain.

External Treatment.—The liniment as prescribed for rheumatism is also useful, and should be faithfully applied; or the liniment and ointment recommended for neuralgia may be employed with good results.

Use of Opiates.—When it is necessary to administer opiates to subdue the intense pain, it should be done under the advice of a physician. In an emergency, a dose of from fifteen to twenty drops of laudanum may be administered, either on lump sugar or in a tablespoonful of water.

Scrofula.—Make a decoction of walnut leaves, one ounce to pint of boiling water, and give one tablespoonful four times a day; or sulphide of lime in one-quarter to one-half grain doses, given after meals, is most efficacious.

Scurvy.—Use a decoction of dogwood root, one ounce to pint of boiling water; strain and cool and give tablespoonful four times a day. Give a vegetable diet.

Shingles.—Make solution of yerba rheuma, one ounce to pint of boiling water, and apply freely to part several times a day; or apply morning and night an ointment prepared from the oleate of mercury or belladonna ointment.

Sick Stomach.—Tablets of lime water; tablets of subnitrate of bismuth; aromatic spirits of ammonia.

Sleeplessness.—Persons so affected will be benefited by the use of a pillow composed of hops, or cup of warm hop tea on retiring, or bathe with dilute alcohol; or ten-grain doses of bromide of potassium or a teaspoonful of tr. valerian.

Small-Pox.—At once give a wineglass of infusion of pitcher-plant, made with one ounce to pint of boiling water, three or four times a day. Consult a physician at once.

Sore Eyes.—Boric acid.

Treatment.—1. In simple cases, where there is heat and pain in the eye, with some redness of lids and white of eye, this lotion is generally effective:

Borate of soda	2 grains
Camphor water	1 ounce

Mix. One or two drops in eye four times a day; also, saturate a small piece of lint in this mixture and apply it over the eye.

2. Another good lotion is composed of:

Hydrastis (Golden Seal) root	½ ounce
Best green tea	½ ounce
Sulphate zinc, pulverized	1 drachm

Steep the root and tea for a few minutes in a pint of boiling water; while cooling add the sulphate of zinc; when cold, strain well and bottle. Use as an eye wash three times a day. In severe cases a poultice is useful, made from pulverized slippery elm and warm milk and water. In most cases an active purgative is needed, such as a 5-grain blue pill at evening for two or three days, followed each morning by about half a bottle of citrate of magnesia or a seidlitz powder. In place of this the antibilious pills (see article on Bilious Fever) may be used.

All eye-washes must be used with caution, especially those containing belladonna or caustic solutions, or more harm than good may result.

Sore Mouth.—Boric acid; chlorate of potash; peroxide of hydrogen.

A disorder very common in infancy and childhood and sometimes affecting adults.

Treatment.—1. To correct the acidity of the stomach, which causes the disorder, give small doses of a few grains of prepared chalk or calcined magnesia dissolved in sweetened water. Wash the mouth frequently with the following excellent gargle:

Sumach berries	2 tablespoonfuls
Sage leaves	2 tablespoonfuls
Hyssop leaves	1 tablespoonful
Borax, pulverized	1 teaspoonful

2. Make a very strong tea, with a pint of boiling water, of the first three ingredients; sweeten with syrup or honey, and add the borax; stir well together and use frequently.

3. To cure canker in infants who are still nursing, the mother should chew small pieces of rhubarb root (two or three pieces the size of a pea) every day. This will benefit the child through the mother's milk. For grown children and adults the following laxative will probably cause the canker sores to disappear:

Flowers of sulphur	1 tablespoonful
Cream tartar	2 teaspoonfuls

Mix in one-half cupful of syrup and take one teaspoonful three or four times a day.

4. In some cases these little sores are very hard to get rid of, and assume a very angry appearance. For this phase of the disorder the following is highly recommended:

Tincture perchloride of iron ..... ½ drachm
Glycerine ..... ½ drachm

Mix. Dip a camel's-hair brush into the mixture and lightly touch the ulcers with the point of the brush; after holding it there a moment, rinse out the mouth with tepid water. This is a little painful, but usually produces a radical cure. Or touch each sore with lunar caustic or trichlor acetic acid.

Sore Throat.—Hardly any remedy for sore throat proves more efficacious than the old-fashioned plan of tying around the throat a slice of fat bacon on which is sprinkled black pepper. Gargle with peroxide of hydrogen.

Sour Stomach—Heartburn.—SYMPTOMS.—This common and distressing complaint results simply from undue acidity of the stomach caused by errors in diet or by dyspepsia. It produces a burning sensation in the stomach and under the breast-bone, often accompanied by nausea.

TREATMENT.—Take the following mixture, after meals, when the trouble occurs:

Baking soda ..... ½ teaspoonful
Water ..... ½ cupful

and avoid pickles, preserves, candies, sweet cakes and all sweetmeats.

Spleen, Enlargement of.—See *Enlarged Spleen.*

Sprains.—Hot water locally; laudanum and water; later camphorated soap liniment.

St. Vitus' Dance.—Make infusion of black cohosh, one ounce to pint of boiling water; strain and cool and give teaspoonful four times a day, or two drops of Fowler's Solution three times a day.

Stings of Insects.—Apply hartshorn or water of ammonia to part, which neutralizes the formic acid, the active principle of the poison.

Sun Stroke.—Apply alternately hot and cold applications to forehead and base of the brain or back of neck; place the feet in warm mustard water, and apply mustard to stomach and calves of legs. Keep perfectly quiet.

Sunburn.—Anoint the affected surface two or three times daily with plain vaseline or cosmoline or benzoated zinc ointment.

Tonsilitis.—Chlorate of potash, a teaspoonful in a teacupful of water, and gargle throat frequently. Borax, put quarter teaspoonful in teacup of water and gargle throat frequently.

Toothache.—Apply oil of cloves on small piece of cotton and place in cavity of tooth, or rub gum lightly with oil of sassafras. Or, a drop

of laudanum on a pledget of cotton, inserted loosely into cavity, if one exists. Hot water bag applied to face sometimes affords relief.

Tympanites.—Make mixture of one tablespoonful of turpentine to half pint of water, and apply as fomentations, hot as can be borne.

Ulcer.—Make poultice of fresh scraped carrot, and apply to ulcer or sore two or three times a day, keeping parts well cleansed.

TREATMENT.—1. Foul and indolent ulcers, old sores, and so forth, require cleansing and healing applications. Among the best washes is the following:

Carbolic acid, crystals	20 to 40 drops
Pure water	1 pint

2. Wash thoroughly with peroxide of hydrogen.

3. An excellent ointment for old sores and ulcers, is made as follows:

Burnt alum	1 ounce
Red precipitate	4 drachms
White vitriol	2 drachms
Sugar of lead	4 drachms

Pulverize finely together and make into an ointment with one-half pound of cosmoline or plain vaseline. Heat the vaseline and stir into the mixed powder, allowing it to cool slowly while stirring.

Urine.—Boil three tablespoonfuls of watermelon seeds in one pint of water, strain and cool, and give tablespoonful every half hour until relieved. Put patient in hot bath. Give five to ten grains of Dover's Powder.

Varicose Veins.—Apply witch hazel night and morning, and wear bandage during day.

Vomiting.—A distressing and harrassing affection, induced by various causes. But, no matter what the cause, mustard applied as follows is the sovereign remedy: A mustard plaster, made with two or three teaspoonfuls of common mustard, with the white of one egg (don't use water or vinegar in mixing the mustard), and apply the same to front of throat and directly over the pit of stomach, will quickly relieve the most obstinate case of vomiting, caused either by biliousness, nervousness or indigestion; or lime water and cracked ice may be used.

Vomiting, to Produce.—Emetic of mustard and warm water, or of syrup of ipecac.

Warts—To Remove.—TREATMENT.—Take a little nitric acid in a

glass-stoppered bottle and add one-half as much water, making the acid two-thirds normal strength. Apply by means of a little piece of wood, such as a match-stick, taking care to have the stick merely wet, and not with a drop adhering. Hold it on the top of wart until there is a slight burning sensation. Do not apply enough acid to cause active burning. Repeat this process daily, and patiently. In the course of a week or more the wart will be gone. Be careful not to let the acid touch any healthy surface, and do not try to do the work all at once. Avoid making a sore, even if it takes two or three weeks to destroy the wart; or the tri-chlor acetic acid may be used instead of nitric acid.

Water Brash.—Give about quarter teaspoonful of common baking soda in wineglassful of water after each meal.

Wen.—A mixture of ten grains sulphate of copper to two tablespoonfuls of water, and apply three or four times a day.

Whooping Cough.—TREATMENT.—1. Keep the bowels open with castor oil, or the following mixture:

Castor oil	2 ounces
Molasses	4 ounces

Mix well and give a tablespoonful once or twice a day.

2. To relieve the paroxysms of coughing have the following prepared by an apothecary:

Extract belladonna	2 grains
Powdered alum	1 drachm
Alcohol	4 drachms
Simple syrup	4 ounces

Give one teaspoonful of the mixture every four or five hours, or every three hours if the fits of coughing are very severe.

3. Or take:

Antipyrine	32 grains
Tincture belladonna	1 drachm
Syrup tolu	2 ounces
Syrup wild cherry	2 ounces

Teaspoonful every three or four hours.

Womb, Falling of the.—1. A mild infusion of white oak bark, or of alum, or of tannin, used in quantities of a pint as a douche, will often give immediate relief. Peach leaves, mullein leaves and hops made into a tea and used twice a day as an injection often cures when other remedies fail.

Womb, Ulceration of the.—1. The symptoms of pain, soreness and smarting at the neck of the womb yield to an injection of alum water, twice a day. The solution should consist of a third of a teaspoonful of powdered alum in a pint of water.

2. Fluid extract of white pond-lily, in doses of ten to fifteen drops, three times a day, has been recommended as an excellent cure. The same effect follows injections of an infusion of the plant, two or three times daily, at the same time drinking teacupful doses of the infusion three times daily.

3. An infusion of golden seal, used two or three times daily as an injection, proves efficacious.

4. An infusion of oak bark, used as an injection twice a day, is found very curative. If tannic acid be applied directly to the affected part, a like result is reached. A strong solution of tannic acid in collodion is very effective, or sulphate of zinc with warm water as a wash.

Worms.—Make decoction of pink-root tea, one ounce of pink-root to pint of water, and boil to half pint. Give teaspoonful three times a day for two days, followed by purge of castor oil or cream of tartar, or santonin, one quarter grain three or four times a day. Take a wineglassful of vermuth and mix it with twenty-five seeds of the pumpkin, add water and boil, as in making tea. Drink a teacupful of the tea three times a day for two to three weeks. This is the celebrated Kneipp cure for worms as practiced at his sanitoriums in Germany, and is generally effectual. Another valuable remedy is pink-root and senna, one ounce of the former and four drachms of the latter, steeped in a quart of water. Doses, two tablespoonfuls twice a day.

Tape Worm.—Among the many remedies used by the profession, the following have been found useful and harmless to the patient:

1.—

Asafœtida	2 ounces
Garden rue	1 ounce
Garlic	1 ounce
Rye whiskey	1 quart

Bottle and let it stand for about ten days. Dose: One-half wineglassful three times daily, before meals.

2.—

Spirits of turpentine	½ tablespoonful
Castor oil	1 teaspoonful
Milk	1 cupful

Take this dose once a day. For a child under ten years, one-fourth the above, with or without the castor oil. This is also a good remedy for round or stomach worms.

3. A remedy found to possess much value is:

Fresh pumpkin seeds ..... 24 ounces

Macerate and grind to powder; divide into twelve portions, and take one portion three times a day. The bowels should be kept open with castor oil or some similar purgative, and the system stimulated by iron and quinine tonics; food should be kept from patient as much as possible while using this remedy.

Round Worms.—An excellent remedy for round or stomach worms is the following:

American wormseed ..... 1 ounce
Cassia senna ..... 1 ounce
Manna ..... 1 ounce
Carolina pinkroot ..... 1 ounce
Boiling water ..... 1 quart

Macerate the first four ingredients thoroughly together and add the boiling water; let it steep in a closed vessel for an hour or more; sugar and milk may be added. Dose for a child: One gill four times daily, on an empty stomach. Good also for pin worms.

Pin Worms.—These may often be destroyed by using the following injection:

Powdered aloes ..... 5 grains
Hot water ..... ½ pint

Mix and divide into two injections and use at about bloodheat.

The following has also been used with success:

Quassia chips ..... 1 ounce
Water ..... 1 pint

Boil, strain and inject into the bowel.

Wounds, Healing of.—Wounds may heal by what is known as *first intention* or *primary union*—that is, when asepsis or freedom from germs has been obtained and preserved, resulting in that the wound quickly heals and leaves but little scar. But if a wound does not heal by first intention, then it comes under the slow process of *second intention*—that is, with formation of granulations—and finally leaves a large scar. Second intention is in evidence when the skin has been destroyed over such area that the edges cannot be brought together, when the wound is disturbed, when blood collects in it, forcing it apart, or when the wound is dirty—that is, when asepsis has not been preserved. Contused and lacerated wounds generally heal by second intention.

BOOK XI

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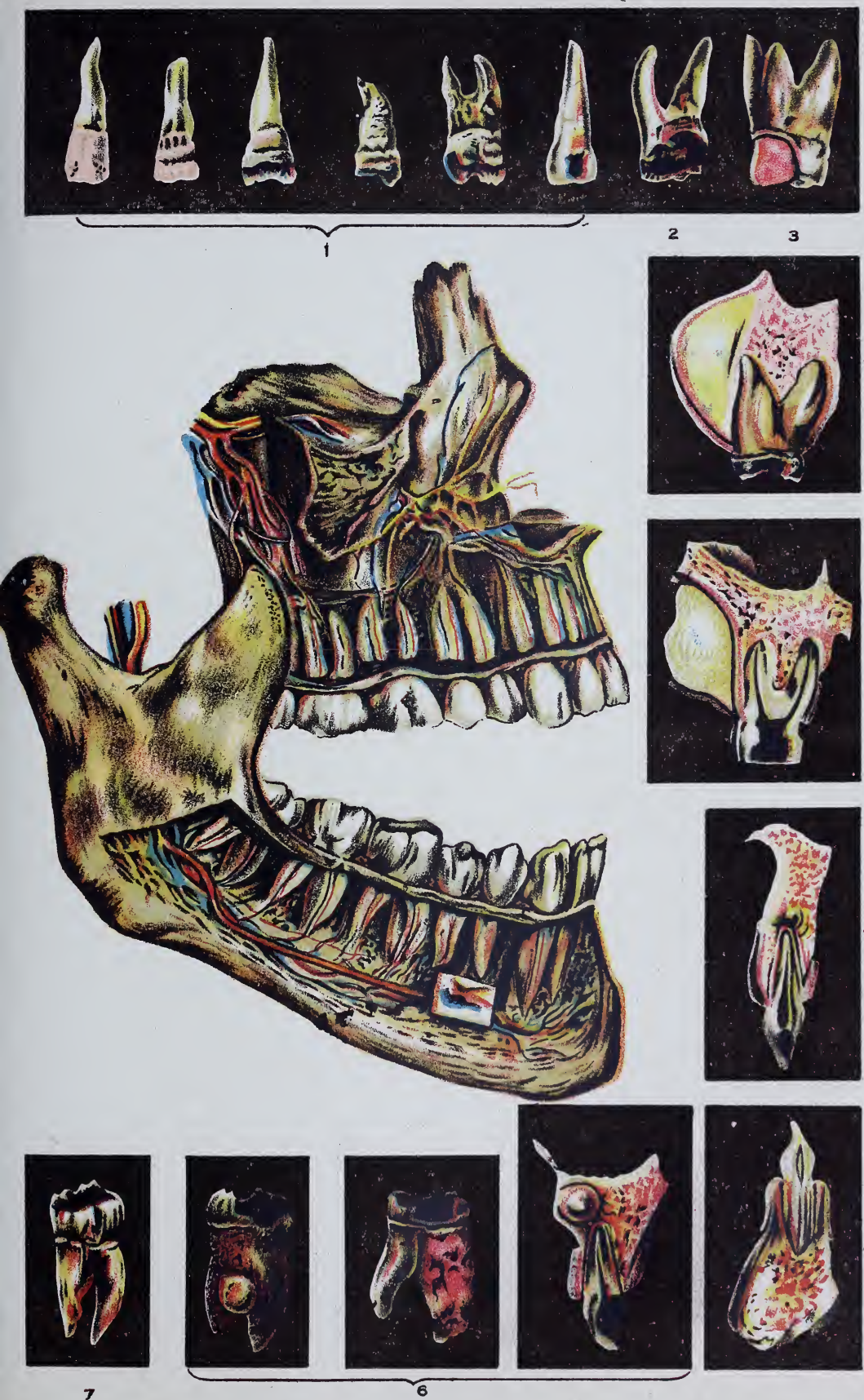
Diseases of the Teeth



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Book XI

THE CARE OF THE TEETH

INCLUDING A CONSIDERATION OF THE GUMS, THE MOUTH, ETC.

It has been well said that a healthy stomach indicates a healthy body, and many people give much attention directly to this organ, yet do not consider the requirements of its accessories without which the stomach cannot perform its functions. Prominent among the accessories are the teeth.

It is the purpose of this chapter to outline the close relationship between the stomach and the teeth and to show that none can be healthy who neglect the care of the teeth. In order to understand the relationship in all its bearings it will be necessary to consider for a moment the nature of the digestive organs generally.

THE DIGESTIVE ORGANS.

Nature's contrivance for the digestion of food consists of the alimentary canal and of certain accessory organs. The alimentary canal (see Fig. 1) is a muscular-membranous tube about thirty-five feet in length, extending from the mouth to the anus, and lined throughout the entire extent with mucous membrane. This canal is given different names in the various parts of its course, the entrance being called the mouth, where provision is made for the separation of the food into properly-sized particles by mastication and for its admixture with a fluid secreted by the salivary glands; beyond this are the pharynx and the œsophagus, the organs which convey the food into that part of the alimentary canal—the stomach—in which important chemical changes occur and in which the reduction and solution of the food takes place preparatory to digestion. The only substance which enters the circulation through the wall of the stomach is water, which is taken up by the process of *osmoses* or molecular attraction. The next part of the alimentary canal is the small intestine

where digestion of the food after admixture with the bile and pancreatic and intestinal fluids commences. The nutrient elements of the food are partially absorbed in the small intestine, complete absorption taking place in the large intestine, where the waste material is collected and expelled from the system through the rectum and anal canal. Each part of the alimentary canal must properly perform its functions in rotation, and if there be failure on the part of any one portion, undue work is thrown upon the succeeding portions, and these, being thus overtaxed, are liable to become diseased. The pharynx, æsophagus, stomach and intestines each perform their functions automatically, but the mouth only receives what the individual chooses to put into it, and it performs its functtions as directed by the will, and therefore if there be no deformity it is a matter of individual control whether this organ shall or shall not properly perform its functions. The mouth cannot be made to perform its functions properly, however, if it or any of its accessories be diseased, and the teeth are the most important of these accessories. The mouth also is the medium of speech, and has other duties to perform, in all of which the teeth play an important part.

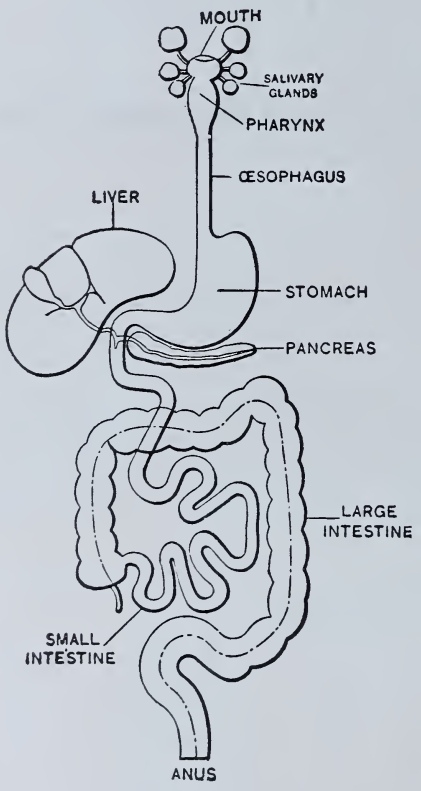


Fig. 1.
The Digestive System.

THE MOUTH.

The mouth consists of two parts—an outer, smaller portion, called the vestibule, and an inner, larger part known as the cavity proper of the mouth.

The Vestibule.—The vestibule is bounded in front and laterally by the lips and cheeks, and behind and internally by the gums and teeth. It contains various glands and ducts and is lined with mucous membrane.

The Cavity of the Mouth Proper.—This is bounded laterally and in front by the alveolar or tooth-socket arches with their contained teeth; behind it communicates with the pharynx by a constricted aperature termed the *isthmus faucium*. It is roofed in by the hard and soft palate. The greater part of the floor is formed by the tongue, the remainder being completed by the reflection of the muscles from the sides and under surface of the tongue and the sublingual muscles which are attached to the mandible (lower jaw bone). The whole cavity is lined with mucous membrane. Upon lifting the tongue from its natural position the true floor of the mouth with its ducts and muscular arrangements may be examined.

The Palate.—The palate forms the roof of the mouth and consists of two portions, the hard palate about two-thirds in front and the soft palate about one-third behind.

The hard palate is bounded in front and at the sides by the upper alveolar arches and gums and at the back it is continuous with the soft palate. It consists of horizontal processes from the upper maxillary bones arching over the mouth and dividing it from the nose. The bone is covered on both sides by a dense structure of fibrous tissue which contains many mucous glands.

The soft palate is a movable slanting fold suspended from the posterior border of the hard palate. It consists of a fold of mucous membrane enclosing muscle fibres, nerves, lymphoid tissue, glands, etc. When occupying its usual position it is relaxed and pendant. Its anterior or upper border is attached to the posterior margin of the hard palate and its sides are blended. Its posterior or lower border is free.

Uvula.—Hanging from the middle of the soft palate is a small, cone-shaped pendulous process, called the uvula. It varies greatly in length in different individuals. It is composed of glands, connective tissue and muscle and is covered with mucous membrane.

Cleft Palate.—This is a frequent oral deformity, and may be either congenital or acquired. It may also be partial or complete. Most of the cleft is in the middle line. It may be a mere cleft of the uvula, it may be limited to the soft palate or it may involve the hard palate as well, and may or may not pass through the gums. Complete cleft is usually accompanied by harelip.

The Gums.—These are composed of a dense fibrous tissue distributed over the portions of the maxillæ holding the teeth. They also surround the necks of the teeth. They are covered by a smooth and vascular mucous

membrane, remarkable for its limited sensibility. Around the necks of the teeth the fibro-elastic portion presents numerous fine papillæ, is exceedingly dense and is in the form of a free fold of tissue known as the Dental Ligament or gum margin, and from here is reflected into each alveolus or tooth socket, where it is continuous with the periosteal tissue lining that cavity.

THE TEETH.

The human being is provided with two sets of teeth, which make their appearance at different periods of life. Those of the first set appear in infancy and are called the temporary, deciduous, or milk teeth. Those of the second set are called permanent or succedaneous teeth.

Temporary Teeth.—These are twenty in number; four incisors, two canines and four molars in each jaw (Figs. 2 and 3).

Permanent Teeth.—These are thirty-two in number; four incisors, two canines, four biscuspids and six molars in each jaw (Figs. 4 and 5).

The dental formulæ may be represented as follows:

Temporary Teeth.

Permanent Teeth.

General Characteristics.—Each tooth consists of three portions: the *crown* or *body,* projecting above the gums, the *root,* entirely concealed within the alveolus or tooth-socket, and the *neck* (the constricted portion between the root and the crown), covered by the gum margin.

Roots.—The roots of the teeth are firmly implanted within the sockets or alveoli of the jaws. These sockets are lined with periosteum, or fibrous tissue, which has strong fibres running from bone to root and fixed in each. This entire fibrous structure is the peridental membrane, better called the pericementum.

Surfaces.—Owing to the arch of the mouth such terms as anterior, posterior, internal and external are not applicable to the teeth and special terms are therefore applied. That which faces the lips and cheeks is called the *labial* and *buccal* surface, respectively; that toward the tongue, the *lingual* surface; that toward the middle line of the mouth (supposing the teeth were arranged in a straight line outward from the central incisor) is called the *mesal* surface; while that directed away from the middle surface is called the *distal* or distant surface. As both are in contact with adjacent teeth, both are called approximal surfaces. The surface which comes in contact with the teeth of the opposite jaw when at rest

is called "occlusal surface," when gliding over one another, the "articulating surface."

DESCRIPTION OF THE TEMPORARY TEETH.

The temporary, deciduous or milk teeth (Figs. 2 and 3) are smaller than the permanent set, but resemble the latter in form. The neck is more

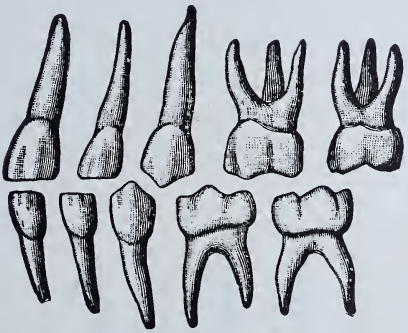


Fig. 2.
Temporary Teeth of left side. View from outside of mouth.

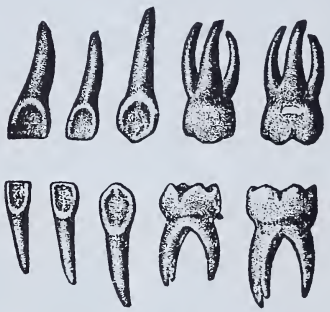


Fig. 3.
Temporary teeth of right side. View from inside of mouth.

marked owing to the greater degree of convexity of the labial and lingual surfaces of the crown. The last of the two temporary molars is the largest of all the deciduous teeth. The first upper molar has only three cusps—two labial and one lingual. The second upper molar has four cusps. The first lower molar has four cusps. The second lower molar has five cusps. The roots of the temporary molar teeth are smaller and more diverging than those of the permanent set, but in other respects bear a strong resemblance to them.

DESCRIPTION OF THE PERMANENT TEETH.

Incisors.—The incisors or cutting teeth are so called because of their sharp edges adapted for incising, cutting or tearing of food. They are eight in number and comprise the four front teeth in each jaw. The crown is directed vertically and is chisel-shaped. The labial surface is convex, smooth and highly polished. The lingual surface is concave and is marked by two marginal ridges extending from an encircling ridge at the neck to the angles of the cutting edge of the tooth. The neck of the tooth is constricted. The root is long, conical, transversely flattened, thicker before than behind, and slightly grooved on either side in the

longitudinal direction. The root is sometimes curved. The incisors of the upper jaw are larger and stronger than those of the lower, the central incisors being larger and flatter than the lateral. The direction is obliquely downward and forward.

Cuspid (Canine) Teeth.—These are four in number, two in the upper and two in the lower jaw. They are larger and stronger than the incisors, especially the roots, which are deeply implanted. The crown is large, spearhead in form, and its convex labial surface marked by three longitudinal ridges, the concave lingual surface being also marked by three ridges, which unite at a basal ridge. The point or cusp is longer than the other teeth. The root is single, is oval or elliptical in form, and is longer and more prominent than the incisor roots. The upper cuspids are larger

Fig. 4.
Permanent Teeth. Right side.

and longer than the lower. The lower cuspids have the general form of the uppers, but their approximal surfaces are much more flattened, as are also their roots.

Bicuspid Teeth or Premolars.—These are eight in number, four in each jaw, two upon each side of each jaw. The crown has two cusps which are separated by a groove. The necks of the teeth are oval. The roots are single and laterally compressed, those of the upper bicuspids being more so than the lower, and less rounded.

Molar Teeth.—These are twelve in number, six in each jaw, three being placed back of each second bicuspid. They are the largest and

strongest teeth of the permanent set and are adapted for the crushing and grinding of food. The crowns are convex and flattened. The necks of the teeth are large. The first upper molar has three roots, one large and two smaller, and the second upper molar has two roots of about the same size. There are only two roots in the lower molars, each of which is much flattened. The first molars are the largest of all the teeth, the second molars not only being smaller, but having their crowns more compressed. The third molars are commonly called wisdom teeth from their late eruption. These "wisdom teeth" have three cusps upon the upper and five upon the lower. The roots of the upper are frequently fused together, forming a grooved cone, which is usually curved backward. The roots of the lower (two in number) are compressed together and curve backward. Unlike the other molar teeth, the third molars have no definite number of roots. They may have from one to as many as five roots.

ARRANGEMENT OF THE TEETH.

The human teeth are arranged in two rows or arches, the upper row or arch being larger, its teeth overlapping the lower row or arch. Owing

Fig. 5.
Front and side views of the teeth and jaws.

to the smaller sizes of the lower incisors, the teeth of the mandible, or lower jaw are each one-half a tooth toward the mesal of the upper corresponding tooth, so that each tooth of the whole series of upper and lower teeth has two antagonists, with the exception of the lower central incisors and upper third molars (see Fig. 5).

The order of placement of the teeth in both the upper and lower jaws is as follows: Four incisors in front; immediately behind these on each side are the cuspid teeth; next come the bicuspids, two on each side; behind these on each side are the three molar teeth.

The movement of the lower jaw in mastication is rotary. In the lateral movements but one side is in effective action at one time.

STRUCTURE OF THE TEETH.

The teeth are composed of four principal parts: Enamel, Dentine, Cementum and Pulp.

Enamel.—This is the outer covering or occluding surface of the tooth. It is the hardest tissue in the human body. Because of its great density it is admirably adapted to the purposes of mastication of hard substances. The enamel may be easily distinguished from the dentine by its clear, lustrous and somewhat translucent appearance.

Dentine.—This is the principal constituent of the teeth. It lies under the enamel and is permeated by a great number of minute canals which connect with the pulp chambers. It is a hard, elastic substance with a yellowish tinge and is slightly translucent.

Cementum.—This is a thin structure covering the root of the tooth, and extends from the neck to the apex.

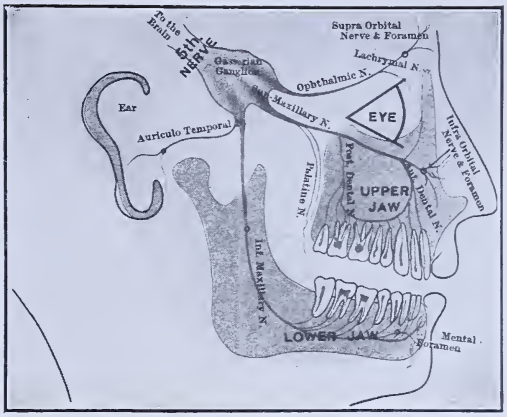
Pulp.—This is contained in what is called the pulp chamber of the tooth, which is an elongated canal, wide at the crown and narrow at the root portion. It is a soft tissue containing the nerves and blood vessels of the tooth. It is the vital part and sends forth minute fibers of living matter through the microscopic canals of the dentine, thus affording nourishment to it and endowing the teeth with sensation. These fibres when exposed to irritants like salt, sweet or acid substances, cold or heat, or when touched furnish a sensory response which should be taken as a warning of decay.

ERUPTION OF THE TEETH.

"Eruption" is the word generally used to indicate the appearance of the teeth, whether temporary or permanent. Eruption varies somewhat in different individuals, but approximately may be relied upon as follows:

Temporary Teeth.—

Central incisors	5th to 6th month.
Lateral incisors	7th to 8th month.
First molars	12th to 16th month.



Cross-section of head.

Teeth of child between six and seven years old. Bone removed to show second set forming in the jaws.

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Canines .....14th to 20th month.
Second molars .....21st to 36th month.

NOTE.—The eruption of the lower teeth usually takes place before that of the upper.

Permanent Teeth.—

First molars ..... 5th to 6th year.
Central incisors, lower jaw..... 6th to 7th year.
Central incisors, upper jaw..... 7th to 8th year.
Lateral incisors ..... 7th to 9th year.
First bicuspids ..... 9th to 10th year.
Second bicuspids .....10th to 11th year.
Cuspids .....11th to 13th year.
Second molars .....12th to 13th year.
Third molars (wisdom teeth).....17th to 23rd year.

It is to be noted that the permanent first molar does not replace any tooth of the temporary set, yet is the first permanent tooth to appear. As a rule, it comes painlessly. It comes back of the temporary second molars and frequently being mistaken for a "first" tooth, it is neglected and decay ensues.

FUNCTIONS OF THE TEETH.

The teeth are a potent factor in speech and are of utility in other ways, but the most important of all their functions is that of mastication. Each and every tooth has its own specific work to do in the preparation of food for the stomach, and if even one tooth be lost or impaired there must follow a deterioration in the masticating powers, and hence the danger of sending food to the stomach in an improperly prepared state. It is not merely the grinding and disintegrating of the food, but the very process of mastication brings about a flow of saliva, the mixing of which with the food is essential to digestion. If this work of masticating the food be thoroughly performed before it passes to the stomach, the food is rendered easily susceptible to the action of what is known as the gastric juice, which is found in the stomach, and which by reducing the food to a liquid state prepares it for absorption into the system. When, however, the food is swallowed without proper mastication, the action of the gastric juice is retarded, becomes largely ineffective, and fails to yield all the nourishing essence which it contains. The result is indigestion, and if long continued, dyspepsia. All this applies both to the temporary and the permanent teeth, and it will therefore be apparent how important

it is that from very earliest childhood until old age the greatest of care should be taken to preserve all the teeth in such a manner that they may completely and efficiently perform their functions.

ERRONEOUS IDEAS CONCERNING TEMPORARY TEETH.

It is a common but grave mistake to consider preservation of the temporary teeth as of minor importance because they are so soon to be replaced by the permanent teeth. It is due to this impression that decay and filth are frequently allowed to accumulate and as soon as the teeth become troublesome they are extracted. School children lose sleep, suffer pain, have indigestion, lose time from school through sickness, are dulled mentally by all these processes and fall behind their normal rate of advance. Thus it is not theory but proven by tests of special classes in various mental attributes before and after dental treatment. The total average gains were from 32 to over 100 per cent., representing the average for all kinds of mental effort.

The idea that these deciduous teeth should be taken out as soon as they ache is not only erroneous, but may result in permanent injury to the mouth by preventing normal expansion of the arches for the accomodation of the permanent teeth, prejudicially affect the permanent teeth which are forced to appear before their allotted time, and cause life-harm to the digestive system, since the power of mastication is impaired through loss of the teeth. Nature indicates the time for the removal of the temporary teeth by absorbing their roots and loosening their crowns preparatory to the appearance of the permanent teeth, and when the proper time arrives the permanent teeth practically oust the temporary ones from their places without pain or inconvenience of any kind.

There is also danger in premature extraction of the deciduous teeth, because the jaw at this time is not fully developed, is frail and not only is liable to malformation, but to possible fracture if the socket of the early tooth be left vacant.

CAUSES OF DECAY.

There are many possible causes of decay of the teeth, but chief among them is the fermentation of particles of food lodged between the teeth or in the pits or depressions during mastication, and which through carlessness or indifference are not removed. Under the influence of warmth, moisture and microbes, fermentation or chemical change takes place, and

an acid is generated which dissolves the enamel and dentine, leaving a cavity which grows larger and deeper. The dentine is of a tubular structure and into these tubules microbes, which constantly exist in the mouth, penetrate as soon as there is opening through the enamel, and unless proper measures be taken to eradicate them and make the tooth impervious to them, they continue their work until the tooth is completely destroyed.

Fig. 6.
Temporary teeth in child aged about 4 years. The permanent teeth are seen in process of formation in their alveoli or sockets.

The process of fermentation itself is the result of the growth and multiplication of these minute organisms, which are so small that they are only visible under microscopes of the highest power.

Among secondary causes producing decay may be mentioned protracted illness, the lack of outdoor exercise, excessive study, worry, or anything tending to lower the general tone of the system. When the body is ill all organs are more likely to become diseased than at other times, and this holds good as respects the teeth.

Again, the teeth may be crowded or depressed, or there may be fis-

sures which offer a ready means for lodgment of food. The structure of the enamel may be imperfect and full of microscopic spaces, thus affording less resistence to the action of acids and bacteria.

Like the bones and other parts of the body, the teeth need constant nourishment, especially in childhood, and not infrequently it happens that the food partaken of does not contain the elements of nourishment requisite for the proper development of the teeth. Sometimes, too, there is hereditary tendency to decay.

When one tooth is decayed and permitted to remain in a decaying state it is certain sooner or later to affect and cause the decay of teeth in close proximity, for wherever there is decay of a tooth there are acids and microbes which will find their way to the surrounding teeth.

PREVENTION OF DECAY.

An adage handed down from the immemorial says: "An ounce of prevention is worth a pound of cure." Never was this saying more applicable than it is in respect of the preservation of the teeth, and the *sine qua non,* or indispensable condition, is CLEANLINESS.

The vital importance of keeping the teeth and the mouth free from remnants of food and masses of tartar cannot be too strongly urged. Competent members of the dental profession affirm that ninety-five per cent. of all diseases of the teeth are the outcome of uncleanliness at some time in the life of the individual concerned. Whether it be during childhood or in adult years, the accumulation of particles of food upon and between the teeth invariably sets up fermentation, which continued must result in decay of the teeth. And not only are the teeth affected, but putrefaction may ensue and the mouth itself become the very center of disease and infection. Were the mouth to be kept perfectly clean and pure, from earliest infancy onward, teeth would never decay. But, as this is practically impossible, the only safeguard is to thoroughly clean the teeth and the mouth after each meal, that the remnants of food may be each time removed before deleterious action sets in.

Tartar.—This is a deposit of animal and mineral matter combined, precipitated from the fluids of the mouth upon the teeth, imparting to them a greenish, yellowish, darkish and occasionally a whitish color, and sometimes accumulating in such quantities as to completely incrust the teeth. Some of the effects of tartar upon the mouth, teeth and gums may be thus enumerated:

1. Spongy and sloughy gums, subject to bleeding upon the slightest irritation.

2. Suppuration of the gums, pus frequently accumulating in such quantities as to make the mouth most unwholesome.

3. By working its way between the gums and the teeth, such absorption of the bony socket ensues as to cause the teeth to either fall out of themselves, or permit of their removal with the least display of force.

4. Vitiation of the saliva occurs, and as this fluid is essential to digestion, the digestive organs are deranged and the entire system consequently disturbed.

5. Disagreeable odors are imparted to the breath, making the sufferer obnoxious to everyone.

It is then a first principle of prevention of decay that the teeth be kept free from accumulations of tartar. This cannot be accomplished by the mere polishing of exposed surfaces. There must be daily, diligent work in cleaning crevices and the brushing away of tartar before it reaches a hardened stage.

When a tooth is allowed to become incrusted with tartar, it is impossible for anyone to remove it himself or herself, because the accumulations cannot be seen by oneself, while further there is the necessary use of professional instruments. It is to be advised, therefore, that from early childhood the teeth should be examined at least twice a year by a competent dentist, and all tartar and other impurities properly removed.

Keeping the Teeth Clean.—After the teeth have been cleaned by a dentist, effort should be made to keep them clean by washing them several times daily with lukewarm water, polishing with a powder or other dental preparation and by using an antiseptic mouth-wash. Lukewarm water is recommended not only because it is more cleansing than either hot or cold water, but also because either hot or cold water, especially if one follows the other, will have a prejudicial effect, for as the laws of expansion and contraction will cause a glass to break when plunged from cold into hot water and *vice versa,* so in the case of the teeth a sudden change from one extreme to the other may cause the enamel to crack.

Choice and Use of Toothbrush.—A soft rather than a hard toothbrush is recommended, as the latter irritates and abrades the gums. Brushing should be from the gums towards the summits of the teeth—that is to say, longitudinally and transversely. By brushing across the teeth, particles of food may be forced between the teeth, and so become centers of decay.

After being used, the brush should be thoroughly washed, that all decomposed matter caught by the bristles may be removed.

A silk floss is of advantage in cleaning the teeth, by forcing it between the teeth, and thus removing matter which may have become lodged, and the daily use of floss silk with tooth powder in the same manner is recommended as an adjunct to the toothbrush.

Tooth Powders, Pastes and Mouth Washes.—Great care should be exercised in selection of these. There are undoubtedly many excellent preparations on the market, but on the other hand there are many of them which should be condemned. Some of them, for instance, clean the teeth very quickly and so seem to have much merit, yet they contain acids which work upon the mineral salts of the teeth, causing corrosion and dissolution, thus eating into the enamel and destroying the teeth. Another fatal error committed by many manufacturers is in the endeavor to make their pastes and washes palatable by sweetening, for which purpose a considerable percentage of sugar or like ingredient is used. Sugar in the mouth undergoes a chemical change, and is converted into an acid which is deleterious to the teeth. Then again because of economy the average tooth powder is made of cheap, gritty and coarse materials which by abrading the enamel frequently become a cause of decay. It is of vital importance then that special care should be taken in selecting pastes, powders and washes, and it will usually prove poor economy to use a preparation simply because it is cheap and quickly cleanses. It is not here intended to decry all patent tooth preparations, but simply to caution our readers as to selection. For those who wish to make a powder themselves, the following will be found safe, useful and agreeable:

Precipitated chalk	12 drachms
Rose pink	2 drachms
Carbonate of magnesia	1 drachm
Oil of rose	5 drops

Mix well together.

Or,

Precipitated chalk	1 ounce
Pulverized orris root	1 ounce
Pulverized castile soap	1 ounce

Flavor to suit with oil of rose, sassafras, wintergreen, etc.

A good mouth wash may be made up with the following ingredients:

Boric acid	10 grains
Resorcin	4 grains
Salol	2 grains
Thymol	½ grain
Pure glycerine	½ drachm
Pure water	1 ounce

To neutralize the acidity of the stomach use lime water, taken internally in moderate doses. It is very efficient in hardening the teeth. Lime water is of little value as a mouth wash. It has no action on bacteria, is not an antiseptic and the antacid effect is so momentary that it is of little value. Nevertheless, it is very valuable as an antacid, the idea being that an acid stomach is contributary to deranged nutrition and lime water in the stomach is an offset. A better antacid, however, is to be found in milk of magnesia. A mouthful "soused" about the teeth will upon expectoration of the excess leave a coating on the teeth and in the interproxinal spaces.

A solution of bicarbonate of soda makes another excellent mouth wash. Use a teaspoonful in a glass of water after each meal. Like lime water it has a neutralizing effect when there is acidity of the mouth.

The teeth should be thoroughly cleaned and the mouth well rinsed every morning and every night and also after each meal. Lime water should occasionally be used to overcome extreme acidity of the mouth, as it is an alkali and neutralizes the affects of acids. Acids are not only contained in food, but are frequently found in the saliva itself, especially when one is in a state of debility. Lime water is also a bone builder, and taken internally will be found beneficial, especially with infants and with mothers during pregnancy.

EFFECTS OF DIET.

While lack of cleanliness is the main cause in the decay of teeth, there can be no question as to improper or deficient diet being also an important contributing factor.

The food which is proper for one person may not agree with another, and the question of diet must therefore be solved differently for different people. Temperament, age and occupation must all be considered. Yet there are certain foods which generally speaking are safe for all and which are nutritive to the teeth.

The bones, muscles, flesh, etc., of the human body are formed by

various combinations of some seventeen different elements, chief among which are hydrogen, nitrogen, carbon, and the salts of lime, and each part of the body nourishes and sustains itself by extracting from the blood a sufficient quantity of the elements which enter into its composition, so that if food be deficient in any one element necessary to any part of the body, such part is destined to suffer. With the exception of milk and eggs no one food contains all the elements which enter into the structure of the body, and so to properly nourish all parts of the body, recourse must be had to a diversified diet, in order that deficiency of certain elements in one food may be supplied by abundance in another.

Teeth are of the nature of bone in their composition, and are composed of animal and mineral elements. The mineral matter is the more abundant of the two, and chiefly consists of lime salts, such as phosphate of lime, carbonate of lime, fluoride of lime, and phosphate of magnesia. The teeth gain their strength and hardness from these elements, and if they be absent in any marked degree the teeth are weak, frail and soft. Scientific study has proven that these elements are found in greatest abundance in the following foods:

1. **Milk.**—This contains all the elements entering into the human structure, but as it is especially subject to microbes, it should be sterilized before using, and this is imperative in the case of infants.

2. **Buttermilk.**—Ths is a most valuable food and aids in development of tooth structure.

3. **Cheese.**—This also has high value as a food in aiding teeth structure, but is difficult of digestion if taken in large quantities.

4. **The Cereals.**—Wheat, maize, rye, oats and rice, when ground without separation of their parts, contain elements of value to the teeth, but the white flours should be sparingly used, because in their preparation the lime salts and phosphates are extracted. As an instance it has been estimated that five hundred pounds of graham flour contain seventy-five pounds of muscle and eighty-five pounds bone material, while an equal quantity of white flour contains only sixty-five pounds of muscle and but fifty pounds of bone material.

5. **Eggs.**—The necessary elements for the teeth are contained in eggs and they are nourishing to the whole system. They are better "soft-boiled" than "hard-boiled," and are more wholesome if taken with bread.

6. **Meats.**—Beef and mutton are the most wholesome of the meats and contain a goodly percentage of the elements requisite to the teeth. Veal and poultry are also recommended.

7. **Fish.**—When fresh and well cooked, fish will aid in supply of nourishment to the teeth.

8. **Beans.**—The nutritive value of beans is very high and they are recommended for teeth nourishment.

9. **Peas.**—Peas have much the same qualities as beans, but not in as high degree as respects teeth nourishment.

10. **Potatoes.**—There is good nourishment in potatoes, which should always be eaten before becoming cold, as when cold they are hard to digest. They are most nourishing when baked or boiled with the skin on. Potatoes contain valuable potash salts, which are lost in boiling without the skins, but are retained in baking and roasting.

11. **Vegetables.**—Cabbage, parsnips, carrots, onions, tomatoes and beets are good foods and more or less aid directly and indirectly in nourishment of the teeth, but if taken in large quantities are difficult of digestion.

Innumerable other foods have great nourishing powers, but the foregoing have been especially mentioned because they abound in elements requisite for the teeth. Pastries and dainty viands which in their preparation have been deprived of the phosphates and lime salts (the elements that build up bone and teeth) should only be occasionally indulged in.

Lactophosphate of lime may be used in those cases in which the food is deficient in lime salts. It aids in retention of food in the stomach, strengthens the teeth, and in the case of childbearing contributes to the better development of the bones and teeth of the child. It should be taken in teaspoonful doses three or four times daily.

How to Eat.—This is second only in importance to the nature of the food itself. The following rules should be carefully observed:

1. It is important above everything that the food should be well masticated.

2. Food should not be taken in excess, for not only is the overloaded stomach retarded in the performance of its functions by overwork, but there is lack of saliva and gastric juice for the extra load, the stomach becomes disordered and the saliva acidified, and this acid saliva destroys the teeth.

3. Food should neither be very hot nor very cold. Food digests most readily at normal body heat, or 98 degrees F., and if taken either hot or cold the temperature of the stomach is raised or lowered accordingly, and the work of digestion thus retarded.

4. The stomach should be allowed full freedom of movement—that

is to say, its movements should not be restricted by tight corsets or the like, for these impede movement and retard digestion.

CHILDREN'S TEETH.

In a chapter entitled "The Mother and the Child" (see Index) will be found a full discussion of "Teething" and other matters concerning the teeth of children.

DISEASES OF THE TEETH AND RELATED PARTS.

Excepting in congenital cases, diseases of the teeth are primarily due to decay, technically termed *"caries."* There are many variations in the forms of decay, and among dentists classifications are made technically, distinguishing the different forms and their resultant diseases, but for the purposes of the present article it is sufficient to cover the whole series in general terms. The following then is an epitome:

Diseased teeth may be divided into three classes, namely:

1. Those in which the affection extends only to the dentine. The exposed part is sensitive to the touch and to heat and cold, but the pain is not acute and ceases when the immediate cause of irritation is removed. If attended to at this time the operation of filling is comparatively painless and the tooth becomes thoroughly sound, for the vital portions have not been affected.

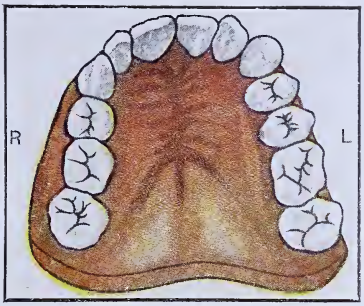
2. Those in which the pulp is exposed, but only recently. The pain is acute and may become agonizing. The pulp can be cured by the application of soothing mediums which will sufficiently remove irritation and inflammation to permit of filling.

3. Those in which the pulp has been long exposed and is either dead or dying. This class is subdivided into:

(a) Those in which the pulp is not yet dead or has only recently died. These can be cured by a competent dental surgeon with comparative ease.

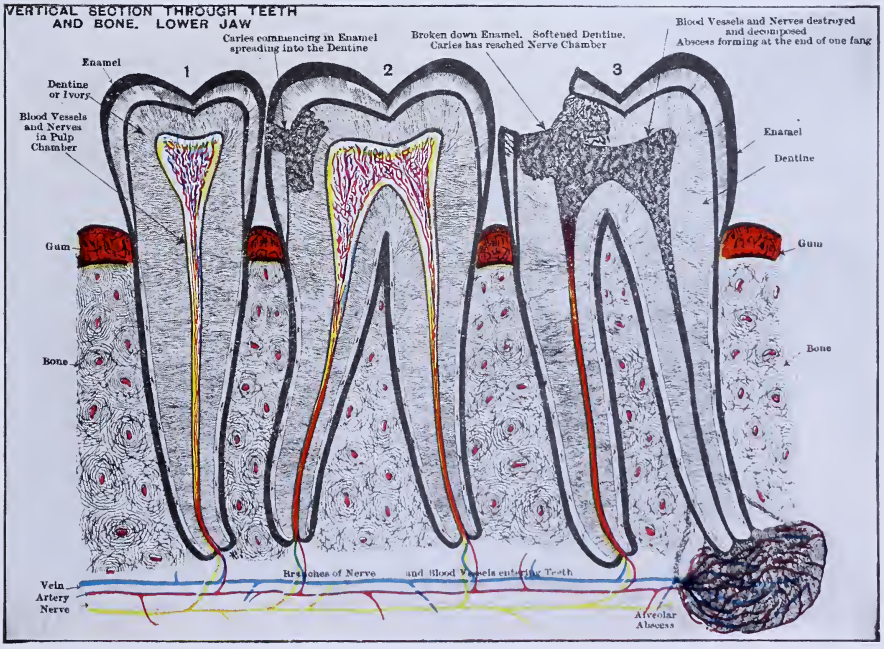
(b) Those in which there is more or less inflammation and infection. These are quickly amenable to competent treatment, but require more skilful work than class (a).

(c) Those with a fistulous opening and a more or less constant discharge of pus. These require long treatment and the exercise of unquestionable skill on the part of the dentist. The canals are often crooked, and as every particle of infected matter must be removed, the task is sometimes performed with great difficulty. It is sometimes necessary to put



Natural crevices on healthy back teeth in which food collects and so leads to decay and formation of cavities.

Upper Jaw.—Showing front teeth and places between the teeth where food has collected and led to decay.



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Dental Caries.

in a temporary filling and leave it there for weeks before attempting permanent filling, watching all the time for untoward symptoms which may indicate that there is still some infected part uncleaned.

The following are some of the specific troubles which occur in connection with diseased teeth:

Abscesses or Gumboils.—These are collections of pus or putrid matter, due to infection and inflammation of the tissues surrounding the roots of diseased teeth, and unless given proper attention may result in serious and even dangerous ailments, such as neuralgia, locked jaw, necrosis, eye, ear and nose troubles, etc., which see under their respective side-headings in this chapter. The pain during the formation is almost insupportable and continues until the pus finds vent. It is a common practice to apply hot poultices to the outside of the face to relieve the pain. This is a grave mistake for it draws the pus toward the cheek and may cause the abscess to break through on the face. The proper method is to make a small poultice of equal parts of mustard and flour and mix into a paste with glycerine. Put this in a small, sterilized bag and apply over the diseased part within the mouth, and on the outside administer cold applications to the cheek. This tends to force a breaking of the abscess within the mouth, which is to be desired. If this fails the abscess should be lanced inside the mouth, its contents removed, the sore antiseptically cleansed and the tooth treated and filled or extracted, according as the circumstances may require.

Caries (decay).—In all cases where possible the tooth should be treated and filled, but a tooth is sometimes neglected so long and the decay becomes so great that the only remedy is the extraction of the tooth.

Cleft Palate.—This is sometimes a congenital defect, but frequently it is what is termed accidental or acquired, being due in some instances to syphilis. Both the hard and soft palates are divided into two parts, which are united in the median line of the mouth. The union usually takes place during the third week of embryonic life, but occasionally the union does not take place and the child is born with a cleft palate. Both in congenital and accidental cleft the affection may extend to both hard and soft palate or may be confined to one or the other. When it extends to both palates the interior of the nose and the bones of the skull are exposed. In congenital cases only little inconvenience is caused in eating for the instincts of self-preservation teach the child from the time of its birth to protect the cleft with the tongue, the food being taken under that organ and dexterously shifted from side to side until forced into the

pharynx. The process is curious and complicated and practically impossible of imitation by anyone who has been born with a normal palate, and so when the affliction comes from disease in adult life the sufferer is utterly unable to close the opening with the tongue, and consequently in eating a portion of the food is invariably forced into the nose, causing inconvenience, suffering and humiliation. But this is not all. Whether the cleft be congenital or accidental the sufferer is unable to speak clearly or distinctly and in some cases speech is utterly impossible. (Formerly the only treatment for cleft was a surgical operation called *staphylorraphy* which signifies suturing or sewing together of the parts. This operation was seldom entirely successful and there was usually an after breaking-away of the parts. Modern dentistry, however, has come to the rescue of such sufferers and artificial palates are now made which are held in place by attachment to the teeth and which are so true in their copy of nature that the sufferer is enabled to eat and speak as perfectly as one with normal palates.)

Syphilitic cleft is not as readily open to surgical treatment as is congenital cleft, and the use of the vellum or artificial cleft is, as a rule, the only remedy. On the other hand, congenital cleft is in its very nature clearly amenable to surgical treatment, and in most cases surgical treatment is to be recommended. It is advised that the operation should be performed in early infancy when ossification of bone tissue has only begun and the bones are very little more than masses of cartilage. Operation should be performed when the infant is from six to nine months of age. The flap of periosteum is laid over the cleft and sewn to the flap on the other side. The periosteum through the action of what are known as the giant cells, is the medium through which new bone tissue is formed, thus closing the cleft. If successfully performed, the results of this operation are more hygienic and in every way to be preferred to artificial vellum. Formerly the operation was usually unsuccessful, but latter-day surgery has accomplished marvelous results when the case has been taken in sufficiently early infancy.

Eye, Ear and Nose, as Affected by Abscess of the Teeth.—Diseased teeth frequently cause trouble with the eye, ear and nose. That portion of the upper jaw bone which holds the roots of the molars forms the floor of a cavity, one side of which is the wall of the nose. Through this wall there is an opening into the nostrils. It sometimes happens that the roots of a molar penetrate into this cavity. The walls of the cavity are thin and lined with a very sensitive membrane. If a penetrating molar be-

comes diseased, inflammation and suppuration (the exuding of pus) may extend into this cavity, and if the pus accumulates in large quantities it will ooze out through the opening into the nostrils. Thus a constant discharge of pus from the nose may indicate a diseased tooth. If the accumulation of pus be very large it may press against the lower wall of the eye socket in such a manner as to displace the eye or cause partial or complete blindness, or it may break through the bone and discharge upon the face. Cases are on record where such abscesses have developed into tumors of such size and pressure as to plug the nose and finally, breaking down the wall of the cavity have dislodged the eye, forced themselves into the ear and even penetrated the brain. The only treatment in former times was extraction, but the dental surgeons of to-day resort to what is known as drainage of the antrum, either through the root of the tooth or by means of a drain introduced through an opening made between the second bicuspid and first molar or through the nasal orifice of the antrum. What is here advised is that the sufferer should immediately consult a competent dental surgeon. Every day of delay but aggravates the condition.

Fractured Jaw.—This subject is fully discussed in the chapter on surgical diseases (see index), but is here mentioned because the treatment of fractures of the jaw is now considered as within the province of the dental surgeon.

Locked Jaw.—This is a dental term and does not refer to *tetanus,* which is commonly termed "lock-jaw." Locked jaw is the result of a severe abscess caused by diseased molars of the lower jaw. Through constant irritation the nerves become paralyzed, the muscles remain in a contracted state and the sufferer is unable to open his mouth. A competent dental surgeon should be at once consulted who will treat the tooth and abscess.

Necrosis.—Death or necrosis of the jaw-bone frequently results from an abscess caused by diseased teeth. When pus is permitted to accumulate in large quantities it may burrow between the bone and the enveloping membrane which gives it nutrition and vitality, and this membrane being thus severed from the bone the latter dies from lack of nutrition and the severe inflammation caused by the abscess. The treatment should be preventive by placing oneself in the hands of a competent dental surgeon at the beginning of the trouble. Where necrosis has actually set in the tooth and abscess must be first treated and then the bone treated as prescribed in the article on Diseases of the Bones (see Index).

Neuralgia.—The nerves of the eye, ear, face and teeth are intimately associated and an ulcerated tooth may cause severe neuralgia in any or all of these parts. This is thoroughly recognized by the oculist and aurist who frequently advise attention to the teeth as first treatment in seeming ailments of the eye and ear.

Pyorrhœa Alveolaris.—See Rigg's Disease.

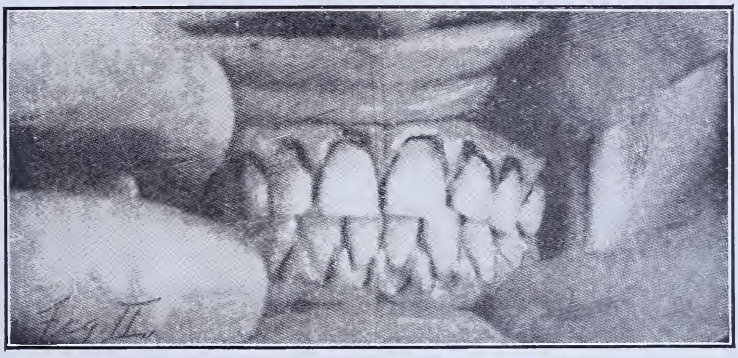
Rigg's Disease.—This disease occurs with considerable frequency, and is especially serious because of the large quantities of pus involuntarily swallowed by the sufferer. It first makes its appearance at the margin of the gum, which normally adheres closely to the necks of the teeth, but which with this disease becomes detached from them and thickened. Even in its early stage small quantities of pus or blood-stained fluid may be squeezed out of the intervening space if firm pressure be made with the finger, and as the disease progresses this becomes more and more marked. Gradually the space becomes greater and deeper until an instrument can be passed down between the tooth and its socket, finally extending the whole length of the root and resulting in complete detachment and loss of the tooth. The disease usually starts with one tooth, but is apt to spread to adjoining teeth and may involve all. The pus is full of organisms. The cause of the disease is not definitely known. It was at one time attributed to irritation set up by accumulations of tartar, but this idea is now discredited. A dental surgeon should be consulted without delay, and where this is not possible the affected gum should be frequently and carefully washed with strong antiseptics and the mouth immediately after rinsed with a good antiseptic mouth wash.

The accumulation of tartar deposits on and around the necks of the teeth constitutes a foreign substance, and if allowed to remain will continuously increase. Deposits act as an irritant to the gum tissue, which becomes inflamed. The numerous micro-organisms which are always present in the mouth and ever ready to act, find excellent soil for propagation in the inflamed area aided by the heat and moisture of the mouth, forming pus and destroying tissue. As a result of the disturbances the blood which is exuded is disintegrated and the lime salts in solution are deposited into the pus socket, thus increasing irritation.

The treatment is simple and positive and lies in a thorough cleansing of the parts affected and in proper and frequent massage of the gums, the idea being to destroy germs and produce normal circulation of the blood.

Toothache.—This is due to the exposure of the nerves of a tooth

Pyorrhea Alveolaris or Rigg's Disease.



Ulcerative Stomatitis.

Vincent's Angina.

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caused by decay. It is a natural accompaniment, too, of abscesses and all other diseases of the teeth. Its treatment should be by filling of cavities. See Home Remedies in this chapter.

Tumors.—See Abscesses.

Ulceration.—An ulcerated tooth is one in which decay has reached the roots causing an inflammation and the gathering of pus. This may occur in a tooth which has been filled, but where the pulp canal has not been thoroughly cleaned and some particle of infected matter has remained. See Abscesses.

HOME REMEDIES.

Toothache invariably indicates a more or less diseased tooth, and where there is disease it should be at once treated by a competent dentist. It is false economy to delay and later may result in serious trouble. Nevertheless there are occasions when it is practically impossible to visit a dentist and in such cases the following instructions will be found of great value and will in many instances afford temporary relief.

ACHING TOOTH WITH A CAVITY CAUSED BY DECAY.

1. **When the Pulp in the Cavity is Living.**—Whether the pulp be living or dead may be determined by holding very warm or very cold water in the mouth and bringing it in contact with the pulp. If the pulp is living the pain will be increased. Or, if on pressing a toothpick into the cavity the pain is intensified, the pulp is still alive. *Treatment.*—The cavity must first be washed out with lukewarm water. This may be done with a syringe or by adequately rinsing the mouth. Then saturate a little pellet of antiseptic gauze or absorbent cotton with spirits of camphor, oil of cloves or laudanum. On top of this insert a piece of dry cotton, so completely filling the cavity as to thoroughly protect it from changes of temperature and prevent the entrance of any foreign substance.

2. **When the Pulp in the Cavity is Dead.**—These cases may be divided into two classes. In the first the suffering is from mere inflammation of the lining membrane between the root and the socket. In the second the inflammation has become more severe and an abscess or gumboil has developed. If the first stage be promptly and efficiently treated the second stage will usually be avoided. Excepting that in the second stage there is swelling of the gum around the tooth the symptoms in the two stages are the same and consist in an elongation of the diseased tooth above the level of those surrounding it, so that on closing the teeth together the dis-

eased tooth is struck first and a painful shock occurs; the tooth is somewhat discolored, being darker, and there is frequently a bad odor. *In the first stage* relief may be temporarily secured in several ways:

(a) By applying a dental plaster to the gums. These may be obtained at almost any drug store.

(b) By rubbing a mixture of iodine and aconite (equal parts) about the gums with a camel's-hair brush or a sterilized rag, first cleaning the gum thoroughly with lukewarm water and antiseptic mouth wash. The application of the mixture facilitates the removal of waste material by causing a more healthy flow of the blood. The remedy must not be swallowed; it is poisonous when taken internally.

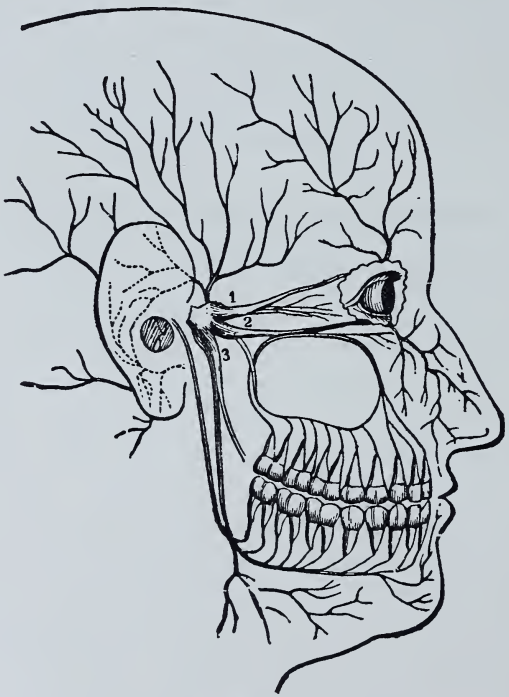

Fig. 7.
Showing nerves leading to the roots of the teeth.

(c) By using a cathartic. The effect of this is to reduce the quantity of water in the blood and so give relief by decreasing the blood pressure.

(d) By pressing with the fingers on large nerve, at points indicated by Figures 1, 2, 3. See Fig. 7.

In the Second Stage; that is, when an abscess is present, temporary

relief may be obtained by the application of poultices to the affected part, within the mouth—never on the outside. The following poultices are recommended:

(a) Capsicum Poultice.—Three parts flour, 1 part red pepper or capsicum; mix; put in small cotton bag; thoroughly warm; apply upon head of abscess in the mouth. Change every three hours.

(b) Flaxseed Poultice.—Put flaxseed in small linen bags and thoroughly heat; apply around the affected gum, replacing with hot poultice as fast as one becomes cool. This aids in bringing the abscess to a head and will prepare it for lancing. The lancing should always be done by a doctor or dental surgeon who will have proper instruments and antiseptic methods. Otherwise there is danger of blood poisoning.

(c) Raisin Poultice.—The seeds should be taken out and the raisins cut in two. Apply in the same manner as with flaxseed poultice, changing the poultices as fast as they become cool, and continuing the applications for several hours.

The breath is usually feverish and foul when an abscess is present, and to relieve this condition an antiseptic mouth wash should be frequently used. Either of the following are good: (1) 1 teaspoonful of bicarbonate of soda in a glass of lukewarm water; (2) 2 drachms carbolic acid, 4 drachms glycerine, 10 ounces rose water. When the abscess is so large as to cause swelling of the face cold applications to the face at the same time that hot poultices are being applied within the mouth are recommended. Heat must *never be applied externally,* as it may cause the abscess to burst through the cheek.

FILLED TEETH THAT ACHE.

When a tooth has been prematurely filled by a dentist; that is, filled before a living nerve is thoroughly quieted, or a dead one completely eradicated, after trouble is almost certain to ensue. It also sometimes happens in spite of the most skilful and cautious work that after the cavity has been filled the pulp dies beneath the filling. Thus there are two classes of disease with filled teeth—those with living pulps and those with dead pulps. When the pulp is alive there is usually intermittent or "jumping" toothache. When it is dead the pain is more constant.

1. When the Pulp Beneath the Filling is Living.—In the first place take a hot foot bath, putting a little mustard in the water. This tends to relieve the blood pressure and so lessens the pain. Then take a saline

cathartic, such as citrate of magnesia or epsom salts, which by reducing the water in the blood relieves blood pressure on the pulp.

2. **When the Pulp Beneath the Filling is Dead.**—Adopt the same method of treatment as that recommended for unfilled, aching teeth when the pulp is dead; that is, apply within the mouth, in the manner described, hot poultices of capsicum, flaxseed or raisins, and use cold applications to the outside.

ACHING GUMS.

Aching gums may result from several causes:

1. **Accumulation of Tartar.**—When this is the cause the gums will have receded from the teeth, the teeth will be more or less loose, the breath foul and usually there will be an oozing of pus from the gums. *Treatment.*—Mix one or two teaspoonfuls of bicarbonate of soda in a glass of lukewarm water and thoroughly dissolve. Rinse the mouth with this solution every hour. Paint gums with solution of aconite and iodine and see dentist.

2. **Effects of Colds.**—There is slight inflammation. *Treatment.*—The gums may be painted with a mixture of equal parts of calendula and water or rinsed with a solution of one teaspoonful of borax to a pint of water. One teaspoonful of chlorate of potash may be used instead of borax.

3. **Result of Recent Cleaning.**—After the teeth have been cleaned by a dentist the gums are apt to be sore for a day or two. This may be relieved by rinsing the mouth every half hour with salt and water—a teaspoonful of salt in a glass of tepid water and thoroughly dissolved. Or, a mild solution of bicarbonate of soda used as a mouth wash at short intervals will be found effective. Or still better, use a solution of aconite and iodine. A mouthful of whiskey or brandy used as a rinse and not swallowed is most effectual.

4. **Result of Lacerated Gums from Extraction.**—Use frequently a mouth wash of *tincture of calendula* diluted with an equal quantity of water. This hardens the gums, soothes the pain and sweetens the breath.

HEMORRHAGE.

Upon extraction of a tooth there is always a certain amount of hemorrhage or flowing of blood. This is normal and usually stops in a comparatively short time without treatment. But occasionally there is what is called secondary hemorrhage, which occurs perhaps several hours

afterward and which is due to a lack of coagulation or thickening quality in the blood, or there may be hereditary tendency to hemorrhage. *Treatment.*—The patient should be placed in a reclining position with the head raised. Apply hot water bags to the feet to draw the blood from the head. Thoroughly wash the mouth and cavity with lukewarm water and then force into the cavity a firm plug of absorbent cotton; take a piece of cork of suitable size, cut a notch in it and place astride the gum over the cotton plug, close the mouth firmly upon it and then bandage the mouth to keep it tightly shut. During active bleeding it is well to hold in the mouth a portion of a solution of two drachms of borax to a glass of warm water. Leather scrapings, alum, cobwebs or pieces of sponge saturated in nut-gall also sometimes prove effective as plugs in emergency. While one or other of these remedies is being employed the physician or dentist should be sent for, as hemorrhage sometimes proves to be of very serious character, requiring the best professional skill.

NEURALGIA.

Neuralgia frequently occurs when the teeth are perfectly sound. Such cases are dealt with elsewhere (see Index); but it is of common occurrence to find neuralgia directly due to diseases of the teeth, owing to the fact that the nerves of the face and the teeth are closely related. In such cases the remedy lies in finding out what tooth or teeth are affected and then removing the cause by having the tooth or teeth properly treated. There is sometimes considerable difficulty in locating the trouble when the tooth at fault is one that has been filled and therefore is apparently sound, but when neuralgia exists without apparent other good reason the question of the teeth should be carefully considered and endeavor made by the dentist to discover the cause.

FOUL BREATH.

Foul breath is one of the most disgusting of ailments, making the sufferer repulsive to all associates, yet in many cases the sufferer is quite ignorant of the ailment as it is not noticeable to himself and associates are usually loth to make mention of the ill. It may arise from disordered stomach or from certain diseases such as catarrhal affections, but probably more frequently than from any other cause it is due to decayed or filthy teeth. If this be the case the sufferer should at once see a dentist, have the teeth thoroughly cleaned and afterward guard against recurrence by daily use of proper powders or tooth pastes and of an antiseptic mouth

wash. In cases where a dentist cannot be seen at once the mouth should be thoroughly washed and rinsed a number of times each day with tepid water in which two grains of permanganate of potash have been dissolved.

SORENESS FROM ARTIFICIAL TEETH.

For a time after artificial teeth are first used there is liability to soreness of the palate. It may be due to the fact that the plate is not accurately fitted, in which case the defect should be immediately remedied by the dentist, or it may be due to the gums not having thoroughly healed after extraction of the teeth; but most frequently it is simply because the mouth has not become accustomed to the artificial contrivance.

Treatment.—The teeth should be removed for several days to permit of the mouth resuming normal conditions. Yet this is not advised unless there be real suffering, as where the discomfort is merely due to lack of custom the retention of the teeth in the mouth is the best means of overcoming the difficulty. Where there is much soreness relief is frequently obtained by use of an alum mouth wash, which is made by putting a piece of alum about the size of a plum in half a glass of water and leaving it there for five minutes. Another treatment is to paint the sore places with the following solution: One ounce of glycerine is placed in a jar and set in warm water, and into the glycerine stir slowly two ounces of tannic acid. Paint on sore spots with a camel's-hair brush.

DISLOCATED JAW.

See Accidents and Emergencies.

BOOK XII

Treats of the Occupational Diseases. The industrial poisons are arranged alphabetically in the form of a table, together with the industries in which they are used, the means by which the poison enters the body, the conditions produced and special measures of relief therefrom.

Acetaldehyde 1334
Acetate of Amyl 1335
Acid, Carbolic 1364
Fluoric 1355
Hydrochloric 1354, 1355
Nitric 1359
Oxalic 1363
Picric 1367
Sulphuric 1370
Sulphurous 1369
Acridine 1334
Acrolun 1334
Air, Compressed 1349
Alcohol, Amyl 1335
Wood 1358
Ammonia 1334
Amyl Acetate 1335
Alcohol 1335
Aniline 1336
Dyestuffs 1337
Antimony Compounds 1338
Arsenic Compounds 1338
Arseniureted Hydrogen 1339
Asphalt 1340
Benzine 1340
Benzol 1341
Binitrobenzol 1352
Bone 1354
Brass 1342
Bromin 1342
Bronze 1312
Broom 1368
Carbolic Acid 1364
Carbon Bisulphide 1343
Dioxide 1343
Disulphide 1344
Monoxide 1345
Oxychloride 1365
Carburetted Hydrogen 1346
Cement 1347
Chinin 1347
Chinone 1347
Chloride of Lime 1347
of Platinum 1367
of Sulphur 1369
Chlorine 1347
Chlorodinitrobenzol 1348
Chloronitrobenzol 1348
Chromium Compounds 1349
Compounds, Antimony 1338
Arsenic 1338
Chromium 1349
Cyanogen 1350
Rhodanic 1350
Sulphocyanic 1350
Compressed Air 1349
Copper 1350
Cotton 1350
Cyanogen Compounds 1350
Cyanide, Natrium 1350
Diazomethane 1351
Dimethyl Sulphate 1351
Dinitrobenzol 1352
Dioxide of Manganese 1357
of Sulphur 1369
Dust, Street 1368

Dyestuffs, Aniline 1337
Earths 1368
Emery 1352
Ether 1352
Methylated 1352
Ethylaldehyde 1334
Ethyl Nitrite 1352
Feathers 1353
Felt 1353
Filings 1358
Flax 1353
Flour 1354
Fluoric Acid 1355
Formaldehyde 1352
Fumes, Solder 1351
Fur 1353
Gasoline 1353
Glass and Emery Dust 1353
Glycerin Trinitrate 1361
Gold 1354
Grain 1354
Hair 1354
Hemp 1353
Horn 1354
Horsehair 1354
Hydric Sulphide 1369
Hydrochloric Acid 1354, 1355
Hydrogen, Arseniureted 1339
Carburetted 1346
Phosphureted 1367
Sulphureted 1369
Iodine 1355
Iron 1355
Jute 1355
Lead 1355
Lime, Chloride of 1347
Lydol 1357
Manganese Dioxide 1357
Meerschaum 1357
Mercury 1357
Metal Filings 1358
Methyl Alcohol 1358
Methyl Bromide 1359
Methylated Ether 1352
Metol 1359
Mirbane Oil 1360
Natrium Cyanide 1350
Nitraniline 1359
Nitrate of Silver 1368
Nitric Acid 1359
Nitrobenzol 1360
Nitroglycerin 1361
Nitronaphthalene 1362
Nitrous Gases 1362
Occupational Diseases 1331
Oxalic Acid 1363
Paper 1368
Paraffine 1363
Petroleum 1364
Phenol 1364
Phenyl Hydrazine 1364
Phosgene 1365
Phosphorus 1365
Phosphorus Sesquisulphide 1366
Phosphureted Hydrogen 1367
Picric Acid 1367
Platinum, Chloride of 1367
Putty Powder 1353
Pyridine 1367
Rags 1368
Rhodanic Compounds 1350
Shell 1354
Silver, Nitrate of 1368
Solder Fumes 1351
Steel 1355
Stones 1368
Straw 1368
Street Dust 1368
Sugar 1368
Sulphocyanic Compounds 1350
Sulphur Chloride 1369
Sulphur Dioxide 1369
Sulphurous Acid 1369
Sulphureted Hydrogen 1369
Sulphuric Acid 1370
Tar 1371
Tobacco 1371
Triton 1371
Turpentine 1371
Vanadium 1372
Volatile Oils 1372
Wood 1372
Wood Spirit 1358
Wool 1372
Zinc 1372

Book XII

OCCUPATIONAL DISEASES

When diseases are spoken of as occupational, it is not meant that they are peculiar diseases to be found only in those employed in certain occupations, but simply that people of certain occupations are more liable to become affected with this or that disease than those employed in certain other industries. There can be no question that occupation has a vital effect upon health. Some occupations are conducive to health, others are not. To follow any special trade does not mean that one must become diseased in some particular form, but that there is greater or less liability to this or that disease. One may handle dynamite without being blown up, yet there is always the risk, and so one may handle white lead without acquiring disease, yet there is always the possibility of lead poisoning. It is essential, therefore, to everyone to understand the hazards of different occupations. Some occupational diseases are very serious, yet are seldom encountered, while others are very frequently met with yet are not serious in their nature. There is a proneness with some people to exaggerate the hazards of certain occupations. Exaggeration should be avoided, yet on the other hand the risks taken should not be underestimated. If the risks be clearly and properly understood they may in many cases be avoided. As a matter of fact the serious occupational diseases may be almost entirely eliminated by proper safeguards, and these safeguards should be provided by employers, as is more and more being appreciated by those in authority and in respect of many risks there are now laws on the statute books which make due provision. There are also many precautions which the employee may take if there be proper knowledge of the risks involved.

Occupational diseases are complex in their nature. One substance may produce some particular ailment, others may cause a variety of ills, according to the special attending conditions. Steel dust is apt to cause "Knife-grinder's Consumption" (pneumonoconiosis); lead poisoning may cause hardening of the arteries (arteriosclerosis), heart troubles, chronic nephritis, chronic anæmia, neuritis, etc.; mercury may cause bone necro-

sis, anæmia and a series of grave nervous and mental disorders. The number of substances and the variety of diseases they may cause are many. Dr. W. Gilman Thompson, of Cornell University and a high authority on occupational diseases, has well pointed out that it is not so much a question of how much of a poisonous substance enters the body, as how much of it is actually absorbed. A knowledge is necessary of the poisonous substances encountered in different occupations, the parts of the body affected by them, the manner of avoiding their ills, and the treatment necessary when the ill has come.

In regard to poisonous substances, they may be broadly classified as follows: (a) metallic poisons; (b) poisonous gases, vapor and fumes; (c) poisonous fluids, such as acids, alkalies, dyes, petroleum products, etc.; (d) irritant dusts and fibers, which may be soluble, insoluble or organic; (e) organic germs, such as those of anthrax, sometimes encountered by butchers, workers in horsehair products, etc.; (f) miscellaneous irritants.

Harmful environment is also a dominant factor and may be summarized thus: (a) air compression and rarefaction; (b) excessive humidity; (c) extreme heat and cold; (d) excessive light, such as X-ray, etc.

Certain tissues and organs of the body are more likely to become injured in one occupation than in another, and such injuries may be thus named: (a) injuries to the blood; (b) injuries to nerves, muscles and bones; (c) injuries to eyes; (d) injuries to ears; (e) injuries to mouth, nose, throat and lungs; (f) injuries to the skin.

The effects of different poisons encountered in industrial work may be divided into acute and chronic. Certain vapors and fumes such as methyl alcohol and sulphur vapors practically always act acutely, seldom if ever acting chronically, while nitrate of silver and some other substances almost invariably act insidiously or chronically, and still others such as carbon monoxide may not only cause acute symptoms but also have serious chronic effect. Cases of chronic poisoning are much more frequent than those of acute poisoning, and as the poison works insidiously serious condition may arise before the victim becomes aware of the nature of the the ill.

When these facts are taken into consideration along with the knowledge that the physique, constitution and temperament of different individuals make them respectively especially liable to certain ills, one may judge whether or not it is advisable to engage in certain occupations—as that which may be perfectly safe for one individual may not be for another. For instance, weavers, hatters and furriers are especially liable to

become afflicted with lung troubles, and therefore when the lungs are naturally weak these occupations should be avoided and some occupation selected which is not conducive to such disease.

As an instance of the effect of occupation upon health, mention may be made of the employees in cotton mills. There are dangers which are direct and obvious in their effects upon the health of workers. The work involves more or less constant confinement in a dusty atmosphere, in addition to which there is usually excessive heat, nauseating odors, irritating gases and generally lack of proper centilation, resulting in artificial moisture which cannot but have a deleterious effect. Dust in cotton workrooms is only a prominent feature in the first few processes. The danger lies chiefly in the opening, picking and carding processes.

This danger from dust in cotton mills may be largely avoided by mechanical contrivances, and so it is with all trades in respect of which dust is a disease factor. The vital thing is to realize the actual danger in connection with each separate employment, and then, whether the danger be found in dust, in noxious gases, in contact with acids, other substances or conditions detrimental to the health, to find the proper means of safeguarding oneself.

In the following table, alphabetically arranged, will be found a list of the various poisonous substances which are to be found in connection with various industrial work, with particulars as to the different industries, where respectively danger exists, an explanation as to the mode of entrance into the body, the general symptoms of poisoning, and special measures of relief in case of emergency. This table has been especially prepared by the Bureau of Labor, Washington, D. C., which Department has authorized their use in this work.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
1 **Acetaldehyde; Ethylaldehyde—** A colorless, very volatile fluid, of pungent odor.	Manufacture of vinegar; silver mirror manufacture.	In the form of vapor, through the respiratory organs and mucous membranes.	Irritation of the mucous membranes of the nose, larynx and bronchi; irritation of the mucous membrane of the eyes; acceleration of the heart's action; profuse night sweats.	Immediate removal from the poisonous atmosphere; artificial respiration; inhalation of steam; electric stimulation of the nerves of the forehead; free bloodletting; in case of obstinate spasm of the glottis, tracheotomy.
2 **Acridine—** Crystallizing in colorless needles.	Organic dyes industry.	Exerts effect in any state of aggregation on skin and mucous membranes.	Irritation and inflammation of skin and mucous membranes; severe burning and itching of the skin; violent sneezing.	See No. 1.
3 **Acrolun—** A colorless, very pungent smelling fluid, of fiery taste.	In the trying-out of fat-containing material, i. e., Bone rendering plants, oil-cloth and linoleum factories, varnish making, soap factories.	In vaporous form, through the respiratory system and the mucous membranes.	Itching in the throat; irritation of the eyes, causing watering of the eyes and inflammation of the eyelids; irritation of the air passages; bronchial catarrh.	See No. 1.
4 **Ammonia—** A colorless gas of sharply penetrating odor.	Coke ovens; mirror-silvering industry; coating iron plate with tin or zinc; manufacture of solidified ammonia and other ammonia compounds; manufacture of the carbonate of soda and of orselle dyestuffs; dyeing industry; sewer cleaning; manufacture of bone black; gas plants; varnish and lacquer manufacture; tanning; beet sugar manufacture; manufacture of ice; refrigeration plants.	In gaseous form, through the respiratory system. Seldom pure, mostly in combination with other gases. Immediate effect on the eyelid and eyeball.	A proportion of more than 0.15 per cent. of ammonia in the air immediately causes an irritable condition of the mucous membranes. Chronic bronchial catarrhs are especially liable to follow long-continued inhalation of small quantities of the gas diffused in the air From these are to be discriminated the acute conditions of transient illness: Intense irritation of the respiratory organs; violent sneezing; lachrymation, redness of the eyes inflammation of the eyeball and eyelids; increased secretion of saliva; burning in the pharynx, and a sense of constriction in the	See No. 1.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			larynx; paroxysmal cough, with secretion of tough, stringy, even bloody mucus; difficult breathing, attacks of suffocation; vomiting of watery matter, ammoniacal odor of the perspiration, retention of the urine, which may last many hours and even two or three days; acute inflammation of the respiratory organs, and scattered areas of inflammation in the lungs, in severe cases a fatal outcome. Protracted breathing of small quantities is apt to cause chronic bronchial catarrh.	
5 **Amyl Acetate—** Zapone, a solution of celluloid in amyl acetate and acetone.	Zapone lacquer, used as a lacquering agent in metallic ware and jewelry factories; manufacture of metallic wire for incandescent electric lamps; oilcloth manufacture.	In the form of vapor through the respiratory organs.	Nervous symptoms; headache; fullness of the head; giddiness; nausea; numbness; disturbances of digestion; palpitations of the heart.	At the first symptoms of poisoning, immediate removal from the workroom to a cool, shady spot; change of clothing; cool affusions; administration of oxygen in connection with artificial respiration; in severe cases, bloodletting with subsequent infusions of physiological salt solution; copious ingestion of milk; in case of weak action of the heart, stimulants (black coffee. camphor, ether, but no alcohol); caution against the use of alcohol during and immediately after labor; total abstinence is advisable.
6 **Amyl Alcohol—** A colorless, oily fluid of very sharp taste and penetrating, disagreeable odor.	Manufacture of fruit essences, nitrite of amyl, valeric acid and aniline dyes; rectification of spirits.	In the form of vapor, through the respiratory system.	Congestion of the head; headache; oppression of the chest; irritation of the air passages.	See No. 5.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
7 **Aniline—** A colorless oil which acquires a tint on exposure to air and light. Like aniline, all other amide compounds of benzol and its bromologues, as toluol, naphthaline, xylol, etc., are poisons. Especially should be mentioned alpha and beta naphthylamine, benzidine, tolidine, paranitramline, the diamines (phenyline and tolyline diamine) as well as the alphyl and aryl compounds of aniline, like their homologues (dimethyl and diethyl aniline, diphenylamine, etc.).	Manufacture of aniline and its derivatives, as well as of aniline dyes; manufacture of photographic materials and the like.	Absorption through the skin, by direct contact or by saturation of the clothing; through the digestive organs; absorption through the respiratory organs as volatile particles and impalpable dust.	Acute Poisoning.—(a) Mild Cases: Pallor of the skin and mucous membranes, with slight cyanosis; a feeling of weariness and weakness; head symptoms—vertigo, reeling, unsteady gait; deficient elasticity of movement; slow, labored speech; irritability (aniline "pip"); condition of slight inebriation, with loquacity, gaiety and defective power of orientation; loss of appetite, constipation and tense, rapid pulse. (b) Severe Cases: Dark blue to swarthy cyanosis; formation of methaemoglobin; bounding pulse; "air-hunger," with great frequency of respiration; lowering of sensibility; sometimes vomiting; painful urination and bloody urine. (c) In the most serious cases: Sudden prostration; cold, pale skin, blue lips, nose and ears; lessening and sometimes complete absence of sensibility; moist, cold skin; small pulse; death in a comatose condition, sometimes after antecedent convulsions. Subacute and Chronic Poisoning.—Anæmia; slowing of the pulse; disorders of digestion, such as eructations, loathing of food, vomiting, diarrhœa, and eczematous and pustular eruptions on various parts of the body, especially on the scrotum; nervous symptoms, as general debility, headache, ringing in the ears, vertigo, unrestful sleep, disturbances of sensibility, often of power of motion; spasmodic muscular pain. Subacute and chronic poisonings are rare. Anæmia and retarded pulse are early symptoms. The blood is of a brownish	See No. 5.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			hue, but microscopically unchanged; occasionally the urine contains blood.	
8				
Aniline Dyestuffs— The majority of the very numerous aniline dyes are non-poisonous. Generally the basic dyes are more dangerous than the acid dyes. Regarded as suspicious or injurious to the health are:				
(a) The various phenol nitrates, dinitrophenol, dinitrocresol (saffron yellow, aniline orange), picric acid (trinitrophenol).	Aniline dye factories; dye houses; also manufacture of explosives.	Action on the skin; in the form of dust, through the respiratory organs; the digestive organs.	Itching, dermatitis, eruption, yellow discoloration of the cuticle and eyelids; sneezing and nasal catarrh; inflammation of the mucous membrane of the mouth; bitter taste; disturbances of digestion; irritation of the central nervous system and of the kidneys. Industrial poisoning by picric acid is extremely rare.	For the itching, 10 grains of menthol to the ounce of petrolatum, or 10 to 15 grains carbolic acid to the ounce. For a permanent relief, change of occupation.
(b) The many naphthol nitrates, dinitronaphthol, Manchester yellow, dinitro and naphthol calcium; tetranitronaphthol.	Aniline dye factories; dye houses.	Action on the skin; in the form of dust, through the respiratory organs; the digestive organs.	Blood poisoning. The morbid symptoms resemble those in poisoning by amido compounds; ailments of the central nervous system in great variety; paralysis.	
(c) The nitroso dyes.	Aniline dye manufactories; dye houses.	In the form of dust on the skin.	Intense irritation of the skin, caused, it is asserted, partly by using excessive quantities of chloride of lime in cleansing the skin.	
(d) The aurantia—hexanitrodiphenylamine; imperial yellow, its sodium salt.	Aniline dye manufactories; dye houses.	In the form of dust on the skin.	Intense irritation of the skin, caused, it is asserted, partly by using excessive quantities of chloride of lime in cleansing the skin.	
(e) Ethyl and methyl violet.	Aniline dye manufactories; dye houses; manufacture of colored pencils.	As dust or fine particles in the eyes.	Inflammation of the eyelid or eyeball.	

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
(f) The meldola dyes, corvulin, indulin, fast black.	Aniline dye manufactories; dye houses.	As dust or atomizer solution (in dyeing by the spraying process); action on the skin and respiratory organs.	Eruptions; severe irritation of the mucous membranes; uncontrollable sneezing.	
(g) Chrysoidin, fast black.	Aniline dye manufactories; dye houses.	In the form of dust; effect on the skin.	Eruptions (probably superinduced by the use of excessive quantities of the chloride of lime in washing the hands.	
(h) Bismarck blue.	Aniline dye manufactories; dye houses.			
9 **Antimony Compounds—** Trioxide of antimony. Antimony trichloride (antimonious chloride, butter of antimony, antimonial ore butter); Tartar emetic (tartrate of antimony and potassium); Golden sulphide (antimony pentasulphide), antimony colors.	Extraction of antimony and its compounds; burnishing of rifle barrels and steel ware; manufacture of antimony alloys, type and stereotype metal, hard lead (ammunition factories), britannia and white metal; remelting of old and scrap metal; manufacture of aniline dyes, fireworks; vulcanizing and red-dyeing of india-rubber (antimony pentasulphide); mordants and fixing materials in cotton dyeing and textile printing.	In the form of vapor (trioxide of antimony, antimonious acid, sulphide of antimony), through the organs of respiration; irritation of the skin; in the form of dust, in the manipulation of britannia and type metal.	Intensely itching eruptions of the skin, caused by local irritation and aggravated in the case of a perspiring skin; inflammation of the mouth, throat and stomach; constipation and intestinal colic; in acute cases, diarrhœa. albumin in the urine, loss of strength, weakness of the heart, vertigo and fainting. It appears to be somewhat doubtful, however, whether all of the enumerated compounds of antimony are detrimental to the health of the workers in them.	See No. 58.
10 **Arsenic Compounds—** Arsenic trioxide (arsenic, white arsenic) smelting dust; arsenous chloride, arsenic colors, e. g., Schule's green (Swedish green), arsenite of copper. Schweinfurt green (pat-	Arsenic mining; roasting of arsenic-bearing ores; manufacturing of glass, colored chalk, chloride of arsenic for etching on brass; shot manufacture; metal working; manufacture of arsenic colors; preparation of organic dyestuffs, colored lights, tex-	In the forms of gas and dust, through the respiratory organs and mucous membranes, the stomach and intestinal canal.	Acute Poisoning.—The first symptoms usually appear after half an hour or an hour, viz., constriction of the æsophagus, pains in the stomach and bowels, vomiting, diarrhœa, debility, cold, bluish skin, severe cramp, lowering of heart's energy, vertigo, headache, faintness, illusions, loss of consciousness, convulsions,	If arsenic has been ingested, thorough gastric lavage is necessary; then administer at once by the mouth 5 tablespoonfuls of a solution of calcined magnesia (70 g. to 500 g. of distilled water); afterwards give a tablespoonful every five minutes until a

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
ent, original, new, moss, mountain parrot, May, Kaiser, Cassel, Paris, Vienna, Kirchberg, Leipsic, Wurzburg, Swiss green), compound of the arsenite and the sulphide of copper. Brunswick green, oxychloride of copper with copper oxide and sulphate of lime. Neuwied green. (Similar, only a larger proportion of arsenic trioxide.) Cochineal (Vienna red), arsenic acid with extract of Pernambuco wood.	tile printing and dyeing; manufacture of wallpaper and colored paper; tanning; manufacture of oilcloth and artificial flowers; taxidermy; painting (outside and decorative); pyrotechnics (Indian white fire). It is to be observed that zinc, silver, lead, bismuth, copper and the commercial acids often contain more or less arsenic.		death, sometimes choleraic symptoms. In mild cases, burning in the pharynx, vomiting, salivation, difficulty in swallowing and indigestion. Chronic Poisoning. — Constant and persistent headache, combined with melancholia; disinclination to labor and sleeplessness, which are sometimes the only symptoms; further, gastric disturbances, such as vomiting and diarrhœa, which result in emaciation and decline of strength; persistent symptoms of nasal catarrh, pharyngitis and bronchitis; frequently skin diseases, in varying form—erythematous, papular and pustular cutaneous eruptions, which also produce abscesses; falling out of the hair and nails; melanosis—that is, the deposition of a brownish pigment, not containing arsenic, on the neck, trunk and extremities. In severe cases, disturbances of the central nervous system; intense, lightninglike, lancinating pains; formication; furriness of the skin; impairment of the sensibility; chilliness; weakness of the muscles; also unilateral or bilateral paralysis, and often loss of the tendon reflexes; sometimes fever; albumin in the urine. The paralyses are transient, or they may last for years, leaving not infrequently permanent disturbances.	movement of the bowels occurs; the internal use of lime water also is recommended for rinsing out the stomach and as an antidote; to counteract the exhaustion, cold affusions, rubbing, hypodermic injections of ether and camphor. In case of chronic arsenical poisoning: Electric vapor baths and electrical treatment are in order; the disturbances of the stomach are to be treated with calcined magnesia and unirritating liquid nourishment (milk, milk porridge, rice porridge, salep); the cachexia, by fresh air and nutritious diet; in paralysis, use iodine preparations and electricity.
11 **Arseniureted Hydrogen**—A colorless, extremely of-	This gas is formed everywhere when, in the use of arsenical acids and metals, hydrogen is generated for	In the form of a gas, through the organs of respiration (generally mixed with hydrogen).	At first no disturbances, or only slight indisposition; after some hours, chilliness, vomiting (food, bile, then blood), pain in the back,	Fresh air and oxygen; later bloodletting; use of an alkaline solution of common salt; mild alkaline

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
fensive gas with the odor of garlic.	technical purposes (e. g., the filling of children's toy balloons); in soldering and etching with arsenic-containing metals or acids, e. g., enamel ware factories, tin, zinc and lead plating works; impure iron silicate, by the absorption of water, develops arseniureted hydrogen.		giddiness, ringing in the ears, faintness, small pulse, bluish discoloration of the mucous membranes; labored respiration; urine at times dark or even black, containing blood or blood crystals. After 24 hours, yellow hue of the skin and mucous membranes, from absorption of biliary fluids, fetor of the mouth (resembling garlic), swelling and sensitiveness of the liver and spleen, headache, delirium, mortal anguish; death or slow convalescence.	drink; analeptics (coffee, camphor).
12 **Asphalt—**	Workers in asphalt.	As dust by inhalation; also by local irritation of the skin.	Bronchitis, inflammation of the eyelid, acne and yellow discoloration of the skin.	For the bronchitis, elix. terpem hydrate and heroin; for the inflamed eyelids, boric acid in hot water and bathe frequently.
13 **Benzine—** A mixture of low-ebullition portions of petroleum, known commercially under various names, e. g., petroleum, benzine, ligroine, gasoline.	Benzine distillation; chemical cleansing plants, glove cleaning; removal of fat from bones, fat solvent; lacquer, varnish and india rubber industries; manufacture of waterproof materials (application of the rubber mass dissolved in benzine); ornamental leather factories; used as a source of power.	In the form of a vapor, through the respiratory organs; to a less extent, probably, through the skin also.	Headache, vertigo, nausea, vomiting, cough, irregular respiration, weakness of the heart, drowsiness and deep sleep with cyanosis of the countenance, coldness of the skin and complete insensibility; on awaking, headache, vertigo and depression, fibrillar twitching of the muscles, trembling, especially of the musculature, as if from chilliness; benzoic acid is found in the urine. Chronic Poisoning.—Headache, flashes before the eyes, ringing in the ears, mental disorder with excitement and a state resembling inebriation, sensory disturbances and hallucinations. The occurrence of chronic benzine poisoning has been contested. The symptoms vary greatly be-	Removal of the patient into fresh air; in severe cases, stimulants, like coffee, camphor; then cold affusions.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			cause the benzine used technically is a complex mixture and not always of the same composition.	
14 **Benzol—** A very unstable, colorless fluid, burning with a bright, very sooty flame; extremely volatile; its like compounds, e. g., toluol, xylol and cumol.	Manufacture of benzol, its like compounds and numerous derivatives; technical use of these products in the manufacture of colors, in carburizing illuminating and water gas, in refining and dissolving of caoutchouc, resins, fats, alkaloids, iodine, phosphorus, and sulphur; in the removal of grease from materials; dye works, laundries; lacquer and varnish factories; the rubber industry.	In the form of vapor, through the respiratory organs; reabsorption through the skin.	Benzol, its like compounds and the rest of the hydrocarbons of coal tar have a specific affinity for the central nervous system and a general action on the protoplasm of the organic cells (fatty degeneration). Female workers, particularly in their developmental years, especially at the time of menstruation, are more susceptible than men to the poisoning, and in an extraordinary degree to the subacute and chronic forms of it. Acute Poisoning.—(a) In mild cases: Cerebral disturbances, humming in the ears, giddiness, sleepiness, a condition resembling inebriation, vomiting and irritant cough, slight flushing of the face. (b) In severe cases: Symptoms on the part of the central nervous system, muscular tremor, like chilliness from exposure to cold; trembling of the whole extremities; finally, tonic and clonic spasms; pale, livid skin; lips remarkably scarlet hued; blood bright red, thin. Discolorations of the skin like those in aniline and nitro-benzol poisoning are wanting in benzol poisoning. (c) In the most violent cases: Hallucinations, delirium, protracted unconsciousness and death in tonic convulsions. Subacute and Chronic Poisoning.—Numerous spots of extravasated blood in the skin, together with severe anæmia; hemorrhage	Prompt removal of the patient into the fresh air; inhalation of oxygen; exclusion of female workers from every employment in which benzol is used.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			from the mucous membranes—in women, from the genitals; fatty degeneration of the internal organs (heart, liver, kidneys).	
15 **Brass—** This may be pure or what is known as "ordinary." Pure yellow brass is made up of equal parts of copper and zinc, while ordinary brass is made up of copper, tin, lead and zinc, the component parts varying in proportion.	All trades where filing, cutting, polishing or casting of brass occur.	In the form of dust, through the respiratory system and entry into the alimentary canal.	Deposit of copper tartar (green) on the teeth, gastro-intestinal catarrh, colic, chills, perspiration, headache, neuralgia, vomiting, taste as of metal in the mouth, chronic bronchitis, wasting of tissues.	Where the various symptoms mentioned appear in the patient, a change of occupation is essential.
16 **Bromin—**	Pharmaceutical and chemical industries.	In the form of vapor, through the respiratory system.		See No. 28.
17 **Bronze—** An alloy of copper and tin, to which small quantities of other metals, especially zinc, are sometimes added, antimony chloride, nitromuriate of platinum and manganese are sometimes used as constituents.	All trades where bronze is used either in powder or liquid form.	Through the respiratory system, either in fumes or dust.	The symptoms are practically the same as those described in respect of brass.	See No. 15.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
18 **Carbolic Acid—**				See No. 76.
19 **Carbon Bisulphide—** A volatile, nauseous, colorless fluid.	Preparation of chlorine compounds, purifying tallow and paraffin wax, vulcanizing rubber, extraction of sulphur from gas-washing materials, extraction of fats and oils in treating rags, bones and raw wool; refining of oil.	As a vapor, through the respiratory system, and in fluid form as a skin irritant. The most serious cases generally arise from absorption by contact with the hands.	(a) Acute Poisoning.—Paralysis of the central nervous system, deterioration of red-blood corpuscles, sleepiness, commonly fatal coma. (b) Chronic.—Pruritis, cough, general bodily pains, vertigo, mental excitation and exhaustion, chills, anæsthesia, cramps, tetany, paralysis, atrophy of the muscles, disarrangement of taste, smell, hearing and vision, dementia.	These various symptoms should be treated by a physician the same as if they were due to other causes. A change of occupation is necessary for permanent relief.
20 **Carbon Dioxide—** A specifically dense, odorless, colorless gas, collecting near the ground or floor.	Generated in mines by the process of breathing, by the burning of miners' lamps, and by blasting; in lime and brickkilns and dolomite calcining kilns; in decomposition and putrefaction gases; in tanneries (tan pits); in sugar mills (saturation vessels); manufacture of carbonic acid and of mineral waters; spirit distilleries; compressed yeast factories, breweries, fermenting rooms and wine cellars; in sewer and well gases; in firing and heating establishments; in the lighting of workrooms; by the exhaled air in closed workrooms and caissons.	In the form of gas, by inhalation.	Large quantities occasion sudden death by suffocation. With the inhalation of smaller quantities the symptoms of illness begin with pressure in the head, vertigo, ringing in the ears and sparks before the eyes, disturbances of respiration, such as hurried breathing and pain in the chest, sometimes psychic excitement and convulsions. Usually in cases of more protracted effect there is loss of consciousness and of the power of motion (or even death by suffocation), with gradual decline of the pulse and respiration, and often with the occurrence of delirium. On prompt removal from the poisonous atmosphere there is a restoration of consciousness with subsidence of the symptoms of illness and recovery in a few days. The occurrence of chronic poisoning by carbon dioxide is doubtful.	Examination of the air of suspected places before entering them; immediate removal from the poisonous atmosphere; artificial respiration to be persevered in for a long time; finally, inflation of the lungs with oxygen; cold affusions; stimulation to the skin; restoratives.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
21 **Carbon Disulphide**— In a pure state it is a limpid, highly refractive, extraordinarily volatile fluid, having an odor like that of chloroform; imperfectly refined, its hue is pale yellow and its odor offensive.	Manufacture of Carbon Disulphide; an agent for extraction of sulphur from the mass in the process of gas purification; disinfection; a solvent for caoutchouc, gums, fats, oils, etc.; in vulcanizing caoutchouc and rubber (patent-rubber factories); for the extraction of lanolin, the refining of tallow, stearin, paraffin, and wax; production of carbon chloride; assembling and setting up carriage wheel rims and rubber tires; imitation silk factories.	In the form of vapor, through the respiratory system; in fluid form, through the skin, e. g., at the dipping of the hands in the fluid.	It causes heavy damage to the red blood corpuscles and to the central nervous system. Acute Poisoning. — In mild cases, marked stupefaction and a sense of intoxication; in more intense poisoning, pallor of the countenance, flaccidity of the arms and legs, even complete insensibility, obliteration of all reflexes, loss of consciousness, due to paralysis of the central nervous system. With the inhalation of concentrated vapor there is a fatal result in a few minutes. Chronic Poisoning.—The earliest symptoms (first becoming manifest, sometimes after employment for a few weeks, but, for the most part, after months or even years) are headache extending from the root of the nose to the temples, a sensation of giddiness and stupefaction, particularly at evening, after the close of labor; later, pain in the extremities, muscular weakness with trembling, spasms or fibrillar twitching, also contractures, transient and permanent paralyses, with atrophy of the muscles; deafness; itching and formication on the skin, reduction of the reflexes, circumscribed and more extensive areas of anæsthesia and analgesia; acceleration of the heart's action, nausea, vomiting, colic, alternate diarrhœa and constipation, the latter condition prevailing in the later stages of the disease; emaciation, disturbance of the sense of vision, sometimes transient, but rare in the initial stage; retrobulbar neuritis, choroiditis, central scotoma, disturbances of the senses of smell and taste. In respect to the	In acute poisoning, removal into the fresh air, warm baths, cold affusions; when there are symptoms of paralysis, electrical treatment; in disturbance of vision, potassium iodide and vapor baths; interdiction of the practice of dipping the unprotected hands into carbon disulphide.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			central nervous system, there is at first a condition of excitement, followed by depression; subsequently, very irritable, violent and explosive temper, with hyperstimulation of the sexual instinct, later its abnormal decline. After several weeks or months, relaxation, melancholy, a dreamy manner, weakness of memory, puerile enunciation, obtuseness. According to Charcot, psychic disturbances occur in 87.5 per cent. of the cases. Mental diseases under the semblance of acute mania and dementia occur with good prospect of recovery; the severer forms appear in cases where there is hereditary predisposition. There have been observed also local evidences of the paralyzing effect of the carbon disulphide upon the parts brought into contact with it, especially in the fingers. The prognosis, so far as the preservation of life is concerned, is favorable; as to the full restoration of health, it is unfavorable.	
22 **Carbon Monoxide—** A colorless, tasteless gas and, when in a state of diffusion, odorless, burning with a blue flame in the air. Coal vapor has from 0.5 to 5 per cent. of carbon monoxide. Illuminating gas, 6 to 10 per cent. of carbon mon-	In industrial plants with defectively planned or ill-tended firing and heating arrangements; plants for the production of industrial gas; mining (mine gases); coal mines; blast furnaces (furnace gas); Cowper apparatus; gas purifications; coke ovens, smelting furnaces; gas machines; lime and brick kilns, dolomite calcining	In the form of gas, through the respiratory organs.	Acute Poisoning.—Increased blood pressure at first, with slowing of the pulse and pounding heartbeat; later, lowering of the pressure, with rapid but small pulse, and not infrequently with discrete spots of dilation in the superficial blood vesels. Remarkably pale-red discoloration of the blood and of the dilated parts. (a) Disturbances of the general health: In mild cases, dull headache, flashes before the eyes, gid-	Removal from the poisonous atmosphere; admission of fresh air; artificial respiration, with inflation of the lungs by oxygen for hours, if necessary; keep head of the injured person slightly elevated; subcutaneous injection of ether; camphor; cold affusions; rubbing; mustard poultice; electrical treatment; insufflation of ammonia

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
oxide and 33 to 40 per cent. of mine gas. Water gas, a mixture of 41 per cent. carbon monoxide, 50 per cent. hydrogen, 4 per cent. carbon dioxide and 5 per cent. nitrogen. Producer gas contains 34 per cent. carbon monoxide and 60 per cent. hydrogen gas.	kilns; iron and metal foundries (drying of the molds); soldering in tin shops; charcoal burning; resin distillation; ironing; heating with open coal brasiers or coke stoves (drying the plaster and walls of new buildings); drying chambers.		diness, ringing in the ears, nausea and fullness in the gastric region. (b) In severe cases: Bluish discoloration of the skin; spasmodic, wheezing respiration; sometimes tonic and clonic convulsions, more often paralytic symptoms, either with weakness of all the extremities or of the lower only, or, indeed, of only single groups of muscles, including the facial muscles. The convulsive stage, which may be altogether absent, is succeeded by the stage of asphyxia, with sensory and motor disturbances, involuntary voiding of urine, semen and feces; subnormal temperature; weak, slow and intermittent pulse; loss of consciousness. As sequels there have been observed pneumonias, inflammations of the skin, paralyses and psychoses, the last two often pursuing an unfavorable course. Chronic Poisoning (among ironers, firemen, cooks, etc.).—Frequent headaches, dizziness, nausea, vomiting, coated tongue, weakness of memory; anæmia without chlorosis; "hot flushes," formication, palpitation of the heart, insomnia, general debility and feebleness of the psychic functions.	vapor; administration of stimulants.
23 **Carburetted Hydrogen—**	Usually mixed with other gases found in coal mines.	Through the respiratory system in the form of a gas.	Asphyxia; syncope, which is usually fatal.	Fresh air, artificial respiration and oxygen.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
24 **Cement—**	Cement workers.	As a dust irritating the eyes and skin, and by inhalation.	Chronic bronchitis, asthma, ulceration of the nasal septum, eczema, pruritis, conjunctivitis.	The various symptoms should be treated as they arise by a physician.
25 **Chinin—** A by-product of petroleum.	Refining of oils.	By locally irritating the skin.	Itching and a scaly eczema on face, arms and sometimes the whole body.	Locally, ichthyol and zinc ointment.
26 **Chinone—** A mixture of aniline, hydrochloric acid and potassium chromate.	Chemical factories.	Irritation of the eyes and skin in vapor form.	Inflammation of the eyeball and brown pigmentation of the cornea and skin.	Treat individual symptoms.
27 **Chloride of Lime—** A white, granular, somewhat dessicative powder, having the odor of hypochlorous acid, and containing 35 to 40 per cent. of chlorine.	Manufacture of the chloride of lime; use of the chloride of lime as an oxidizing and chlorinating agent in the chemical industry (for example, dyestuffs); disinfection; manufacture of chloroform, chlorine, oxygen; bleaching of linen, cotton, paper; cotton print works.	In the form of vapor or dust, through the respiratory organs (inhalation of chlorine gas); direct action on the skin.	More or less severe, irritating symptoms of inflammation in the upper air passages; difficulty of breathing, bronchitis, asthma, sometimes spitting of blood, irritation of the eyelid, weeping; skin hot from action of chlorine; intensely itching and burning eruption on the skin, eczema, burns from the dust of lime and its chloride.	Admission to the employment of such, and only such, workmen as are sound and strong, and free from any predisposition to catarrhal affections; technical arrangements which permit the charging and emptying of the chamber from the outside.
28 **Chlorine—** A yellowish green, suffocating gas of penetrating odor, which forms a solution of a greenish yellow color when dissolved in water.	Manufacture of chlorine, chloride of lime, and of organic chlorine products; bleacheries; paper mills; laundries; ironing; tinning works; manufacture and use of disinfecting agents containing chlorine.	In the form of gas, through the respiratory organs.	The smallest quantities excite severe suffocative sensations and necessitate leaving the room, so that acute chlorine poisoning rarely occurs. Symptoms of Cutaneous Disease.—Burning, stinging formation of nodules, bulbs and even open wounds of the skin.	Removal of the patient into the fresh air; inhalation of amyl nitrite; artificial respiration; on account of the paralyzing effect of the chlorine on the heart, stimulants are required (black coffee, subcutaneous injection of

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			Effect on the Mucous Membranes.—Weeping, catarrh, cough, oppression of the chest and intense difficulty in breathing; bronchial catarrh with hemorrhage; sometimes lobular pneumonia. The concentrated vapor causes uncontrollable cough, spasm of the glottis, cold sweats, cyanosis and small pulse; death occurs within a few minutes (sudden collapse). In its Chronic Effect.—Distress in the gastric region; chronic catarrh of the stomach; heartburn; pallid countenance; catarrh of the respiratory tract; lobular pneumonia; headache, vertigo, insomnia; gradual emacation and premature senescense. Chlorine Acne.—(Occasioned in the electrolytic production of chlorine by chlorinated carbureted hydrogen.) Inflammatory processes in the dermal glands; the occurrence of unusually diffuse, confluent comedones with indurated, dark-green heads; solid infiltration of the sebaceous follicles, their inflammation and suppuration causing pustules and boils.	camphorated oil); to control the irritating cough, hypodermics of morphine or cautious inhalation of steam. **For the prevention of chlorine acne:** Substitution of anodes made of molten metallic oxides for the carbon anodes.
29 **Chlorodinitrobenzol—** Forming yellow crystals. **Chloronitrobenzol—** Forming yellowish crystals of aromatic odor.				See No. 69.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
30 **Chromium Compounds—** Chromic acid, anhydrous; chromates and bichromates, e. g., sodium chromate; sodium bichromate; lead chromate. Chromium colors: Chrome yellow (acid chromate of lead); chrome orange (basic and neutral chromate of lead); chrome red (chrome-cinnabar); acid chromate of lead oxide and lead hydrate; chrome green, poisonous only as a mixture of chrome yellow and paris blue. (See also under lead.)	Manufacture of chromium preparations, chrome colors, and hectograph composition; photography (color and carbon printing); oxidizing agent in the tar color industry; manufacture of matches; wet batteries; bleaching fats, oils and wax; mordand in Turkish red dyeing, textile printing (for neutralizing colors and for dyeing); chrome tanning (two-vat process); staining of wood.	Absorption by the skin and mucous membranes; in the form of dust, through the respiratory organs.	The chromates act very much like chromatic acid itself; pitlike, phagedenic ulcers, burrowing deep and spreading wide, very difficult to heal and very painful, occur almost exclusively on the skin of the hands, more rarely on the arms, thighs, scrotum and penis, resembling syphilitic ulcers; they also appear, though seldom, on the mucous membrane of the tonsils and of the hard and soft palate. With rare exceptions is there extension of the inflammation to, and perforation of, the nasal septum at the cartilaginous portion; eczematous eruptions. Irritations of the eyelids. Irritation of the Bronchioles.—Chronic bronchial catarrh, and small areas of inflammation in the lungs. In recent years the last mentioned symptoms are hardly ever encountered in a remarkably wide field of observation. It is at least extremely doubtful if disease of the kidneys is ever caused by chromium. In handling chromium dyes containing lead there is danger of chronic lead poisoning.	Chromium ulcers are successfully overcome by careful treatment of the slightest injuries to the skin, and by the immediate, complete and skillful closure of the lesions.
31 **Compressed Air—**	Tunnel diggers, divers and workers under increased atmospheric pressure.	Through the respiratory system.	Trouble occurs after return to normal atmospheric pressure. Pain in lower extremities, joints and stomach; headache, vomiting, nausea, dizziness; paralysis and coma. These are indicative of caisson disease, divers paralysis, bends.	

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
32 **Copper—** Usually associated with lead and arsenic.	Coppersmiths, filers, bronzers, miners, smelters, founders, watchmakers, etc.	Sometimes by swallowing, when the poison enters through the alimentary canal, but more usually through the respiratory system in the form of dust.	Vomiting, gastritis, bronchitis and generally such indications as described in regard to brass.	See No. 58.
33 **Cotton—**	Workers in cotton.	A fiber dust producing irritation through the respiratory passages, and in cotton spinning by excessive humidity.	Chronic bronchitis, difficult breathing, anæmia, rheumatism, swellings, dysmenorrhea.	Treat the various symptoms and change occupation.
34 **Cyanogen Compounds—** Dicyanogen; Prussic acid; hydrocyanic acid, a colorless, highly volatile fluid, of penetrating, pungent and irritating odor. **Natrium Cyanide—** Cyanide of potassium, potassium cyanide: A colorless salt, forming crystals which, after fusion, recrystallize, but readily decomposes on exposure to the air, setting free hydrocyanic acid. **Rhodanic (sulphocyanic) Compounds—** Poisonous dose of the dilute hydrocyanic acid.	Extraction of gold; siler and gold plating, galvanoplasty, electro-plating; manufacture of cyanogen compounds and inorganic processes (when organic residua are heated with alkalies); reduction of residuum to gas; blast furnaces; gas works (purification process); dye workers and printeries; photographic establishments; manufacture of celluloid.	In the form of gas, through the respiratory organs; prussic acid, also through the epidermis.	Generally speaking, industrial poisonings by cyanogen are rare. Acute Poisoning. — Moderate quantities of the gas cause vertigo, headache, rush of blood to the head, oppression of the chest, palpitation of the heart, a sensation of constriction at the throat with pharyngeal irritation and dryness, nausea and vomiting, difficult, gasping respiration, with retention of consciousness. To the stage of difficult breathing succeeds that of spasm with cold, perspiring skin, convulsions and involuntary passing of water, with loss of consciousness. In the stage of asphyxiation there are temporary suspension of respiration, retardation of the heart's action, lividity of the skin and mucous membranes, lowering of the body temperature; with inhalation of large quantities, the stage of asphyxia supervenes immediately. Dilation of the pupils; loss of consciousness; a few gasping inspirations; cyanosis of the skin and mucous membranes; collapse; death.	Fresh air; artificial respiration; administration of oxygen; cold affusions and friction; hypodermic injection of ether, camphor; if the poison has been taken into the stomach, give emetics, then immediately wash out that viscus with water, with the addition of one-quarter to one-half of 1 per cent. of potassium permanganate. Kobert recommends a 3 per cent. solution of hydrogen binoxide for subcutaneous injection, doses of 1 cubic centimeter, at different points in the body. An alkaline solution of ferric sulphate, or an antidote for arsenic with some ferric salt, is indicated as the best remedy. To control the convulsions, give morphia hypodermically.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			Chronic Poisoning (very doubtful). — Headache, vertigo, unsteadiness of gait; nausea, loss of appetite, disturbances of the gastric and intestinal functions; slowing of the pulse; albuminuria.	
35 **Diamonds and other precious stones imbedded in lead for cutting or soldering.**	Workers in jewelry.	As dusts cutting and irritating the respiratory tissues, and by fumes from solder.	Bronchitis, tuberculosis, and lead poisoning from solder fumes.	Treat tuberculosis and bronchitis. See No. 58.
36 **Diazomethane—** A very volatile yellow gas.	In methylizing of every kind.	As gas, through the lungs; effect on the skin.	Acute Poisoning.—Severe headache; great physical depression; grave lesions of the lungs; other effects like those of dimethyl sulphate.	Fresh air and stimulation.
37 **Dimethyl Sulphate—** A colorless oily fluid.	Production of methyl ethers, methyl esters and methyl amines; manufacture of artificial perfumes.	In the form of gas, through the respiratory organs; direct action on the skin.	Strongly corrosive effect on the skin and mucous membranes; burns; pains in the nape of the neck and in the thoracic cavity; hoarseness; destruction of the mucous membrane and aspiration of the broken-down products into the lungs; watering of the eyes; conjunctivitis; formation of erosion-eschars and oedema, photophobia and parenchymatous clouding of the cornea; even coma, convulsions, paralysis and a fatal outcome.	

Designation of th Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
38 **Dinitrobenzol or Binitrobenzol—** When pure, crystallizing as slender, colorless, rhombic needles; when impure, in yellow, crystalline cakes.				See No. 69.
39 **Emery—**	Grinders.	As dust, cutting and irritating the respiratory tissues.	Chronic bronchitis, ulcers of nasal septum, rhinitis, inflammation of the ear, injury to the eye, tuberculosis.	Change occupation for bronchitis; sedatives.
40 **Ether—**	Photography.	As a vapor, through the respiratory system.	Vertigo, nausea.	Fresh air, stimulants, artificial respiration.
41 **Ether, Methylated—**	Incandescent mantle makers.	As a vapor, through the respiratory system.	Lassitude, insomnia, headache and nausea.	See No. 40.
42 **Ethyl Nitrite—**	Manufacturing percussion caps.	As a vapor, through the respiratory system.	Difficulty in breathing and blueness of skin. Seldom fatal.	See No. 40.
43 **Formaldehyde—** A liquid, volatilizing as a gaseous vapor of penetrating odor; 10 per cent. formaldehyde, formalin.	Disinfection; manufacture of many organic preparations, especially in the coal-tar color industry; preserving and hardening of human and zoological preparations.	In the form of vapor, through the respiratory organs and mucous membranes.	Intense irritation of the skin and mucous membranes.	Do not enter the disinfection chamber until after the introduction of ammonia and thorough ventilation.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
44 **Feathers—**	Milliners, bedding makers, etc.	As a dust, by inhalation conveying dirt and germs into the lungs; also by inhalation of poisonous dyestuffs used in their preparation, such as lead chromate or arsenic.	Chronic bronchitis, asthma, pulmonary abscess, tuberculosis.	See No. 33.
45 **Felt and Fur—**	Furriers and hatmakers.	As dust, by inhalation, and poisoning by mercury nitrate used in manufacture.	Chronic bronchitis, pulmonary abscess, asthma, chronic mercury tremors, premature senility, tuberculosis.	See No. 33.
46 **Flax and Hemp** Macerated in sulphuric acid.	Those engaged in the manufacture of line and rope.	As dust, causing irritation of the respiratory organs; also causing irritation by fumes from macerating and bleaching agents.	Flax-beater's ague, headache, neuralgia, nasal catarrh with inflammation of the nostrils, bronchitis, bleeding at the nose, parched mouth and throat, inflammation of the middle ear, eczema of the hands and arms.	See No. 33.
47 **Gasoline—**	Cleaning rubber and patent leather and many other materials.	As a vapor, by inhalation.	Blueness of the lips and face. sensation of burning in the mouth; difficulty in breathing, palpitation, sleeplessness, mental aberration. If accompanied by hemorrhage of the lungs it may be fatal.	Fresh air, stimulation and artificial respiration.
48 **Glass and emery dust, including lead and other metals used in glass making; also putty powder; also excessive light and heat.**	Glass factories and all industries where cutting and polishing of glass takes place.	As dust, through the respiratory system, and externally, injury to the eyes from light and heat.	Chronic bronchitis, tuberculosis, conjunctivitis, injuries to the eye from excessive heat and light, wounds to eyes and hands, eczema, rheumatism.	Treatment for consumption if symptoms are found.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
49 **Gold—** Non-poisonous unless associated with acids, potassium cyanide, mercury or the like.	Those engaged in the manufacture of jewelry, gold beating, gilding, etc.	Usually in the form of fumes.	Symptoms depend on the acid or other poisonous substance used.	
50 **Grain and Flour—**	Millers.	As dust, causing irritation to the respiratory passages.	Nasal catarrh, bronchitis, bleeding at the nose, inflammation of the middle ear, "Miller's Asthma," pneumonia and tuberculosis.	Treat various symptoms.
51 **Horn, Bone and Shell—**	Buttonmaking.	As dust, by inhalation.	Chronic bronchitis, tuberculosis of the tissues.	Treatment same as consumption.
52 **Horsehair and other Hair—**	Upholstery, brushmaking, etc.	As dust, by inhalation.	Bronchitis, ulcers, carbuncles, asthma, bleeding at the nose, anthrax.	Treatment for anthrax if symptoms are present.
53 **Hydrochloric Acid—** In a pure state it is a colorless gas that fumes when open to the air, forming a dense, acid, white mist. The crude commercial acid is usually impure, containing arsenic among other admixtures.	Treatment with chlorine of previously roasted ores; potteries (glazing), enameling works, glass factories, soldering; in the chemical industry, manufacture of chloride and sulphate of soda, of muriatic acid, stannic acetate, etc.; manufacture of artificial fertilizers; bleaching, shoddy industry, cotton-print works; carbonizing of materials; india rubber industry.	Action on the skin and nasal mucous membrane; seldom in vaporous form, affecting the respiratory organs.	As a rule, the rarefaction of hydrochloric acid gas is so great that only in exceptional cases do any injurious effects occur, such as irritation of the respiratory organs. A proportion of 0.05 per mille of hydrochloric acid in the air is well borne, but only for a short time. A greater concentration causes chronic irritation of the mucous membranes which are exposed to the vapor. There results also catarrh of the evelids, nasal, pharyngeal, laryngeal and bronchial catarrh, together with dental ulceration of the bone. Concentrated vapor may cause unconsciousness and death.	Removal of the patient from the poisonous atmosphere; inhalation of a finely nebulized solution of sodium bicarbonate. In addition, for acute poisoning, give atropine (1-50 grain) subcutaneously to stimulate the pneumo-gastric.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
54 **Hydrochloric Acid, or Fluoric Acid—** A colorless gas, of pungent odor and forming a dense mist in the air.	Production in chemical works; glass factories; etching on glass; laboratories of the pottery industry; extraction of the fluorides of antimony (substitute for tartar emetic in dye works); fertilizer factories (extraction of phosphorites); bleaching of cane for chair seats and extraction of its silicates.	In the form of gas, through the respiratory organs. In a fluid state it has an immediate action on the skin and mucous membranes.	Intense irritation of the eyelids, nasal catarrh, bronchial catarrh with spasmodic cough, ulceration of the nostrils, gums and oral mucous membrane; also painful ulcers of the cuticle, erosions and formation of vesicles; suppuration under the finger nails.	Fresh air and stimulants.
55 **Iodine—**	Pharmaceutical and chemical industries.	As a vapor, by inhalation.	See Chlorine.	
56 **Iron and Steel—**	All industries engaged in the handling of iron and steel where iron dust or steel filings are present, such as cutlery works, foundries, steel construction works, tube works, sand blasting, emery grinding of iron castings, needles, nails, etc.	Through the respiratory system in the form of dust, or by mechanical injury to the eyes.	Bronchial irritation, knife-grinder's consumption, eye injury, ulceration of the eye, etc.; the eyes may be injured by excessive heat and light.	Treatment same as consumption.
57 **Jute—**	Ropemaking, carpetmaking, bagmaking, etc.	By inhalation of fiber dust.	Conjunctivitis, asthma, bronchitis, anæmia, nasal growths, boils, eczema of scalp and hands, rhinitis.	See No. 33.
58 **Lead—** A bluish white, highly lustrous metal, which on exposure to the air acquires a gray tarnish.	Smelting of lead and lead-bearing ores; manufacture and use of articles made of metallic lead; manufacture and use of lead colors and other lead compounds; in the trade of	Absorption of lead and lead compounds occurs—(1) In isolated cases, through the skin; whether through the uninjured skin is doubtful; (2) in the form of vapor (very finely	Industrial lead poisoning appears as a rule in the chronic form and arises from continuous absorption of infinitesimal quantities of lead during a protracted period of time (weeks, months and even years).	Discontinuance of work in lead at the slightest symptoms of lead poisoning. In lead colic, give first, by the mouth or subcutaneously, morphia, opium or atropine; after-

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
Lead alloys. Lead colors; other lead compounds. Lead sulphuret (galena) is held to be non-poisonous, and some lead polysilicates are regarded as nearly so.	painter, house painter and varnisher; plants for installation of gas and water; in the ceramic industry, the textile industry, etc. Materials containing lead may occasionally be employed in every industry, and that lead colors and other lead compounds are often met with in trade under fanciful names.	divided oxide of lead), and as dust, through the respiratory organs; (3) by way of the digestive tract by means of contaminated foods and drinks (for example, cigars, cigarettes, chewing tobacco). By inhalation the dust, laden with lead, finds lodgment in the upper respiratory tract, and, mixed with saliva, may reach the stomach.	The beginning is insidious, with disturbances of the general health, a sense of weakness, decline of bodily strength; sallow, pale-yellowish hue of the skin. Distress in the region of the stomach, eructations, lack of appetite, metallic taste in the mouth and fetid breath. The blue line (blue-gray discoloration of the gums), which, however, may be absent, even in severe cases; lead colic with constipation, retention of urine; frequently fibrillar trembling of the fingers; lead paralyses, of which the disturbances of sensation (paræthesia and anæsthesia) take the precedence. Paralysis generally affects the extensor muscles of the arm and hand, with atropic manifestations; more rarely, the flexor muscles. Sometimes also there are paralyses of the extensors and flexors of the legs or muscles of the shoulder. Those groups of muscles are especially affected which are most used in the occupational activities. Transient blindness, but also gradually progressive atrophy of the optic nerve; temporary loss of the senses of smell and taste; violent, often fatally ending disease of the brain, sometimes preceded only by slight premonitory symptoms, as irritability and headache, ringing in the ears, insomnia; more often, slowly increasing mental disturbances precede; epileptic convulsions, hallucinations; changes in the blood vessels and of the heart and kidneys (contracted kidney); increase of blood pressure and granular degeneration of the red blood corpuscles.	wards, cathartics (castor oil or podophyllin); in paralysis, electrical treatment, massage and baths; in every case, strengthening diet, iodide of potassium and sudorifics.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			Disturbances in the sexual sphere in women; abortion, premature birth, low vitality of the children.	
59 **Lydol—** A highly explosive fluid.	Blasting and like occupations.	Into the circulation, through the respiratory system in the form of vapor.	Lassitude, headache, backache, blueness of the skin and a yellow pallor; occasionally fever.	Fresh air and stimulants.
60 **Manganese Dioxide—** Brown mineral.	Breaking and grinding of manganese ore; sifting out of the refuse.	In the form of dust, through the respiratory organs.	After protracted action of the poison, the symptoms begin with disturbances of the sensibility, general debility, languor, sharp pains in the extremities, in the small of the back and nape of the neck, creeping sensation in the legs and numbness of the feet; salivation; tremor of the head, tongue and hands; later, locomotor disturbances with uncertain, stamping gait, and, ultimately, the impossibility of safe and sure progression. Affections of the voice (low, whispering) combined with flatness of tone; forced laughter and weeping and lowering of intelligence. Sometimes dropsical affections of the lower extremities.	No prompt treatment possible. Chronic symptoms require special treatment.
61 **Meerschaum—**	Pipemakers.	As a dust, through the respiratory system.	Chronic bronchitis, tuberculosis of the tissues.	Treatment same as consumption.
62 **Mercury—** A silver white, shining	Mixing and smelting of quicksilver; occupation of mirror plater, amalgam gilding and silvering;	Absorption through the uninjured skin; absorbed in the form of vapor and as dust (amalgam dust,	Industrial mercurial poisoning is a chronic poisoning occasioned by work in this metal for a long period, commonly weeks, months,	Relinquishment of the employment; nutritious diet; vapor baths; potassium iodide.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
metal, unchangeable in the air, but evaporating at house temperature. Mercury compounds, amalgams (alloys with metals). Cinnabar is non-poisonous.	manufacture of thermometers, barometers and manometers, incandescent electric lamps, Roentgen and Hitley tubes, mercurial vapor lamps; manufacture of the salts of mercury, amalgams and colors, pharmaceutical products, antiseptic dyes, inflammable materials and explosives; employme t of the salts of mercury, especially in the hare's fur business and felt hat manufacture; photography and steel engraving.	dust of the compounds of mercury).	years or decades. The first symptom is generally increased ptyatism, with swelling and inflammation of the gums and of the buccal mucous membrane, often with the formation of rodent ulcers; besides, there are frequently disturbances of digestion, lassitude and pallor. Associated with the further absorption of mercury, "trethism" supervenes—a peculiar psychic excitability (timorousness, bewilderment, irritability) aside from the characteristic mercurial tremor. In a state of complete repose this tremor is not noticeable, and manifests itself only on voluntary movement, causing a quite distinctive, irregular tremulousness of the fingers, hands, arms and finally, also, of the legs and head. In strictly chronic cases the stomatitis and erethism are absent and only the tremor is observable. Death may result in the worst cases in consequence of the violent tremor and spasms affecting the entire body; in other cases, increasing weakness. Cachexia.	
63 **Metal Filings—**	All workers in metals.	As dust, through the respiratory system; also, if soluble, as in the case of lead filings, through the skin.	Chronic bronchitis, asthma, tuberculosis of the tissues, lead poisoning.	Treat symptoms
64 **Methyl Alcohol (wood spirit)—** A colorless fluid of faint odor.	Produced by the dry distillation of wood; used in the preparation of varnish, lacquer, polish and perfumes: for the denaturing of spirits; for the produc-	Absorption through the digestive organs, also through the skin; in the form of a vapor, through the organs of respiration.	The effect is very persistent; nausea, headache, ringing in the ears, weakness of the muscles, insomnia, delirium, difficulty of breathing and sometimes deafness; inflammation of the throat	The substitution of innocuous media for methyl alcohol in the denaturing of spirits.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
	tion of coal tar colors and pharmaceutical preparations; a solvent for aniline dyes in cotton print manufacture; used in combination with shellac for coating the interior of casks; in cabinetmaking and furniture polishing.		and the mucous membranes of the air passages of the bronchial tubes; finally, death by paralysis of the respiratory apparatus. Conjunctivitis; also serious affections of the retina and the optic nerve, resulting in blindness, even, from atrophy of this nerve. In chronic cases, fatty degeneration of the liver.	
65 **Methyl Bromide—** A colorless, gaseous body of aromatic odor. Methyl iodide, iodine methylate—An ethereal, colorless fluid of somewhat penetrating odor, soon becoming yellow on exposure to the air.	Employed in aniline dye factories.	In the form of gas, through the respiratory organs and the mucous membranes.	In mild cases, vertigo, headache and transient stupor, with diplopia and a sensation of rigidity in the muscles of the eyes. In a severe case there was observed loss of consciousness continuing eight weeks, with staring look, pallor of the skin, retarded pulse and obstinate constipation. During brief intervals of wakefulness there was unrest with increasing excitability.	Fresh air and stimulants.
66 **Metol—** In solution.	Photography.	By irritation of the skin.	Erythema and ulcers of the skin on hands, arms and sometimes the whole body.	Ichthyol and zinc ointment.
67 **Nitraniline—** Forming long, yellow crystals.				See No. 7.
68 **Nitric Acid—**	In making false pearls, nitro-benzol, sulphuric, picric and oxalic acids, metal etching, metallurgy, textile printing, metal plating,	As a gas, it irritates the respiratory mucous membranes and eyes and erodes the teeth. In solution it irritates the skin.	(a) Acute.—Bronchitis, pulmonary dropsy, difficulty in breathing, indigestion, colic, cyanosis, delirium, convulsions. (b) Chronic.—Bronchitis with	Bicarb. soda applied locally.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
	chrome compounds, jewelrymaking.		bloody sputum, anæmia, erosion and perforation of nasal septum.	
69 **Nitrobenzol (mirbane oil, imitation bitter-almond oil)**— A colorless, highly refractive fluid, having an odor like that of bitter almonds; and all nitro compounds of benzol and its homologues. The most of the nitro and chloro compounds are the more poisonous.	Coal-tar color industry and those establishments in which its intermediate products are manufactured, as in explosive works; perfumery and soap factories, pharmaceutical laboratories, etc.	(1) Absorption takes place, first of all, through the skin, both the uninjured and especially the pathologically altered skin, particularly in the case of profuse perspiration; (2) through the respiratory organs; (3) through the digestive organs.	Poisoning by all of the homologues of nitrobenzol is very nearly the same. However, the larger proportion they contain of the nitro groups the more virulent they are likely to be. The nitro-chloro compounds are very much more dangerous than the simple nitro compounds. The first toxic symptoms may appear within a few hours (8 to 24) after absorption of the poison. Acute Poisoning.—(a) In mild cases: Uneasiness, headache, giddiness, nausea, loss of appetite, costiveness, burning sensation of the skin and mucous membrane. (b) In severe cases: A feeling of anxiety, disturbances of sensation, like formication on the legs and furriness of the soles of the feet, ringing in the ears; disturbances of co-ordination (reeling gait, stammering speech), increased excitability of the reflexes, convulsions and a state of general spasm; later, with decline of sensibility, symptoms of paralysis; vomiting; odor of the vomitus and of the exhaled breath like that of bitter-almond oil; jaundice of the skin; at first increased, afterwards diminished, activity of the heart, with lowered tension of the pulse; visual derangements (amblyopia, optic neuritis); blood viscid, brown to deep dun color; diminution of the red blood corpuscles and alterations in their form; formation of crystals. Death may occur with	Immediate removal from the workroom; inhalation of oxygen; artificial respiration; eventually bloodletting; stimulants, nonalcoholic; prohibition of the use of alcoholic drinks during working hours; avoidance of the same, also, outside of employment.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			deep insensibility, without other symptoms. The symptoms which point to blood changes predominate, in severe poisoning over the nervous symptoms. Subacute and Chronic Poisoning.—Jaundiced skin, which gradually becomes cyanotic; blood-crystal formation; symptoms of degeneration and regeneration of the red-blood corpuscles; general debility, anæmia.	
70 **Nitroglycerin, glycerin trinitrate—** An oily, vaporable, colorless fluid without odor.	Manufacture of explosies (dynamite, nitro-cellulose); in the use of dynamite.	Inhalation of the vapor; absorption through the uninjured skin, mucous membranes and wounds of the skin. In the explosion of dynamite the action of carbon dioxide and nitrous monoxide, as well as that of undecomposed nitroglycerin, is present.	Extraordinary toxicity; somewhat like prussic acid; a few drops are deadly, and even mere contact with products containing nitroglycerin may cause poisoning; severe headache, disturbance of the intellect, fainting, vertigo, burning in the throat and stomach; nausea, vomiting, colic; symptoms of paralysis in the muscles of the head and eyes, as well as in the lower extremities; bradycardia and retarded respiration, stertorous and difficult breathing; cyanosis; coldness of the extremities; injection of the conjunctiva; reddening of the countenance. In the mixing and sifting of dynamite: Obstinate ulcers under the nails and on the finger tips, eruption on the plantar aspect of the feet and interdigital spaces of both hands, with extreme dryness and formation of fissures. Explosion of nitroglycerin with little gas: Trembling, rush of blood to the head, vomiting, headache. Explosion of nitroglycerin with much gas: Vertigo, asphyxia,	Absolute avoidance of contact.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			cyanosis, motor paralysis and loss of consciousness; intermittent, stertorous respiration, coldness of the skin, small pulse; after recovery of consciousness, debility, nausea, vomiting, headache, intermittent pulse, and finally death. Chronic Poisoning.—Disturbances of digestion, trembling, neuralgia.	
71 **Nitronaphthalene—** A yellow, friable, crystalline mass of strongly aromatic odor. (See Nitrobenzol.)				
72 **Nitrous Gases (low degrees or oxidation of nitrogen, which appear simultaneously)—** Nitrogen protoxide; nitrogen deutoxide; nitrogen trioxide; anhydrous nitrous acid. Nitrogen protoxide is a colorless gas which, under the influence of atmospheric oxygen, is readily transformed into brown nitrogen dioxide. Below 20 degrees Centigrade nitrogen trioxide is a blue fluid; at the ordinary temperature it separates into nitrogen protoxide and nitrogen deutoxide.	Nitrous gases are produced by the action of nitric acid on deoxidating substances of various kinds, principally on metals (iron, lead, zinc, etc.), on organic substances (coal dust, wood, straw, paper, textile fabrics, woolen refuse, etc.), as well as many other substances (pyriates, sulphurous acid and its salts, soda sediment, hydrochloric acid, iron chlorides, sulphate of iron, etc.); in the preparation of nitric acid, its combinations and salts, among which the nitrous salts also are to be included; metal etching and metal refining; stamp mills and mints; galvanotechnics; nitrification in chemical works and manu-	In gaseous form, through the respiratory organs.	Susceptibility to the effects of nitrous gases fluctuates considerably. Persons who suffer from diseases of the respiratory organs are especially susceptible; not infrequently the continual inhalation of small quantities, for many consecutive years even, occasions no serious disturbances of the health. A pale, sallow complexion and chronic bronchial catarrh may be deemed, nevertheless, the usual consequences of occupational inhalation of very moderate quantities of nitrous gases. Often, however, larger quantities of the poisonous gases are borne for hours together (6 to 8 hours) without discomfort; when suddenly, after a long interval without disturbance, ominous symptoms appear. Symptoms of irritation in the air passages are manifest, as a	Immediate removal from the noxious atmosphere; inhalation of oxygen; finally, bloodletting and infusion of normal salt solution.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
	factories of explosives; celluloid manufacture; sulphuric acid manufacture; production of picric acid, aniline colors, nitro-cellulose (gun cotton, collodion cotton), xyloidine, nitro-starch, nitro-jute, dynamite, abelite, nitro-mannite, nitro-saccharose, viscosine, etc.; nitric acid manufacture and storage; preparations of thorium and cerium; bleaching materials (oils, etc.); hat-making (maceration of the hair; etching and engraving on copper (etching of the plate); dyeing and printing (fixer and mordant).		feeling of constriction of the larynx, spasmodic cough, oppression in the chest, labored respiration, anxiety, cold perspiration on the face, protrusion of the eyes, gasping speech, paroxysms of coughing, bluish discoloration of the countenance, coldness of the hands and feet. Consciousness is at first unimpaired, but with increased difficulty of breathing it becomes dimmed; injury to the teeth. The urine is scanty, brown in color, containing crystals and albumen. Death results from dropsy of the lungs. In very severe cases corpuscle crystallization is observed, and then a general systemic poisoning may result.	
73 **Oxalic Acid—** It forms large, pellucid crystals.	Manufacture of oxalic acid; polishing of metals, especially of copper and brass utensils; used in dye works, chemical cleansing plants (rust and ink stains); straw hat manufacture and straw braiding.	In the form of dust, through the respiratory organs.	Opalescent or bluish discolorations (with brittleness) of the nails; blood stasis in the hands; corrosive action on the mucous membrane of the æsophagus, of the stomach and bowel; weakness of the heart; convulsions and spasms. However, industrial poisonings by oxalic acid are extremely rare	Chalk or magnesia mixed with water; emetics.
74 **Paraffine—**	Arsenal workers, waterproof makers, electric wire insulators.	Into circulatory and digestive system as a vapor when melted; locally, by irritation of the skin.	Diarrhœa, dizziness, headache, gastric disturbances, difficulty in breathing, sweating, eczema and sometimes cancer of the skin.	

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
75 **Petroleum—** A mixture of various hydrocarbons of the methane, ethyl, and aromatic series.	Production of oil; refining of the crude oil; furniture polishing by use of so-called polishing oil.	In the form of vapor, through the respiratory organs. As a fluid it has a direct action on the skin.	The vapors of petroleum cause a profound acute poisoning with a condition of inebriation; shouting, reeling and prolonged sleep without any recollection of what has happened; in severe cases, loss of consciousness, lividity of the countenance, staring look and contracted pupils, almost imperceptible pulse, asphyxia. The chronic effect of petroleum vapor causes numbness and irritation of the Schneiderian membrane. In general, the symptoms of the action of petroleum resemble those resulting from the action of benzine. By reason of the high boiling point of petroleum there are produced in the extraction of paraffin butter, in the handling of crude paraffin, in the emptying of retorts, and in the filling of casks with petroleum, obstinate inflammations of the hand in the form of acne (nodules, pustules and boils).	Removal into the fresh air; in collapse, a tepid bath with cold affusions; subcutaneous injections of camphorated oil.
76 **Phenol (carbolic acid)—** A white crystalline mass and its homologues, e. g., cresol, lysol and their derivatives.	Anthracite coal tar distillation; production of picric acid and of many organic aromatic compounds; used in dyeing, calico printing; manufacture of lamp-black, in photogen factories; impregnating wood with tar and oil of tar; surgical dressing industry.	Action on the epidermis and the digestive tract.	Erosion of the skin, which by great extension may lead to severe internal injuries; symptoms of degeneration in the blood and in the internal organs (nephritis); gangrene, icterus, collapse.	Locally, bicarb. soda or alcohol; internally, demulcents and oils.
77 **Phenyl Hydrazine—** A yellowish, oily fluid, shading into brown, of pungent odor.	A by-product in the manufacture of antipyrine from aniline; manufacture of organic compounds.	Absorption by the skin; action on the skin.	Obstinate vesicular eruption on the skin, with itching and burning; diarrhœa, loss of appetite; granular degeneration of the blood corpuscles; formation of crystals in the blood; a sense of faintness.	Remove at once from exposure to chemical; special treatment for symptoms required.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
78 **Phosgene (carbon oxychloride)—** A colorless gas, of suffocating odor.	In the manufacture of phosgene and its use for the production of organic compounds.	In the form of vapor, through the respiratory organs.	Until the present time only the acute form of poisoning has been recognized. The first symptoms of illness sometimes appear only after many hours. By means of the hydrochloric acid arising from the decomposition of the gases in the lungs, destruction of lung tissue results, with difficulty of breathing, paralysis of the lungs and pulmonary dropsy. A fatal outcome is often observed.	Inhalation of oxygen and medical attendance immediately after breathing the phosgene gas.
79 **Phosphorus—** A colorless, transparent substance; on exposure to the light translucent and of a yellowish, waxy luster. In the air it is luminous, and when heated in closed iron crucibles to a temperature ranging from 250 degrees to 300 degrees C. it is converted into red or amorphous phosphorous, which is unaffected by the air. The yellow or white phosphorous is very poisonous; the red, non-poisonous.	Extraction of phosphorus from phosphorites and coprolites, boneblack (refuse of sugar mills), boneash (refuse of meat extract manufacture); production of phosphor bronze, of phosphorus compounds, igniting agents, matches and tar colors.	In the form of vapor, through the respiratory organs; into the digestive canal by means of food contaminated by the fingers; action on the skin.	As industrial poisoning it occurs only in the chronic form occasioned by the absorption of very minute particles of the poison for a period of months, generally, indeed, of years. Symptoms of the disease sometimes first appear long after relinquishment of the occupation. It is doubtful whether chronic phosphorism occurs (that is, general systemic poisoning by phosphorus). Chronic phosphorus poisoning uniformly affects the bones of the face, beginning with inflammation and sclerosis of the bones and of the periosteum; then, by extension of the suppurative process, necrosis results. This most frequently attacks that portion of the alveolar process of the jawbone which is least protected against infection. Swelling and ulceration on the gums and the buccal mucous membrane, pain even in the sound teeth, loosening and falling out of the teeth, infiltration of boardlike hardness occurs in the soft parts surrounding the jaw; sup-	To the utmost possible extent the prohibition of the use of white or yellow phosphorus; exclusion of laborers that have dental caries; after extraction of a tooth at least two weeks' exclusion from the employment; change of occupation; improvement of the general health; there is no specific medical treatment; in appropriate cases, operative intervention.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			puration and destruction of the jawbone (necrosis) with numerous fistulous channels which here and there burrow through the cheek. Hand in hand with the ulcerative processes go osteoplastic formations, so that, while suppurative destruction of tissue takes place at one point, at another the formation of new bone is going on. The under jaw is more often affected than the upper; here the process goes on insidiously without formation of new bone, but with local destruction of the part. The palatal and orbital bones may be attacked with ulceration and shrinking of the eyeball. By extension of the inflammation along the sheaths of the vessels there result meningeal inflammation and cerebral abscess. There is remarkable brittleness of the bones, decline of appetite, pallid complexion, diarrhœa, emaciation. Sometimes there is amyloid degeneration of the abdominal organs. Death by sepsis.	
80 **Phosphorus Sesquisulphide—** A grayish yellow, odorless and tasteless substance.	In chemical factories.	Inhalation of sulphureted hydrogen in the fusion of phosphorus and sulphur, as well as in the drawing off of the molten mass from the kettles; dust in the grinding and sifting of the paste; bicarburet of sulphur vapors in the extraction of yellow phosphorus and regeneration of carbon disulphide.	Irritation of the mucous membranes; obstinate conjunctivitis. Through the influence of dust in the grinding and sifting of the composition there appear symptoms of carbon disulphide poisoning. To be noticed also is the danger of poisoning by sulphureted hydrogen. (See under Sulphureted Hydrogen.)	Prevention of the contamination of phosphorous sesquisulphide with yellow phosphorus; precautions against injury from the effects of sulphureted hydrogen.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
81 **Phosphureted Hydrogen—** A colorless gas of nauseating odor.	In the extraction of phosphorus; in the preparation of red phosphorus and the sesquisulphide of phosphorus; in the reduction of iron silicate containing phosphorus by the action of moisture; in the production of acetylene with calcium carbide that contains an admixture of calcium phosphate.	In the form of gas, through the respiratory organs.	An oppression in the chest, changing to a burning, lancinating pain; affections of the head, vertigo, tinnitus aurium; general debility; loss of appetite; great thirst. Death occurs without convulsions, through the effect of the poison on the blood.	Fresh air and stimulants.
82 **Picric Acid—** Trinitrophenol in a pure state forms pale yellow, bitter tasting foliate, metallic crystals.	Chemical works, dye houses; manufacture of explosives and powder (lyddite, melinite); projectile factories, filling shops.	In the form of dust, through the respiratory passages; direct action on the skin.	Poisonings with picric acid are rare; when they occur there are itching, inflammation of the skin, vesicular eruption, yellow pigmentation of the epidermis and of the conjunctiva, inflammation of the buccal mucous membrane, bitter taste, disturbances of digestion, epigastric pain, nausea, vertigo, diarrhœa and jaundice; picric acid decomposes the constituents of the blood. By the penetration of dust into the nostrils, sneezing and nasal catarrh are occasioned.	Wearing of rubber gloves; instant removal of the patient from the poisonous atmosphere.
83 **Platinum, Chloride of—**	Developing in photography.	A skin irritant especially apt to affect the mucous membranes.	Eczema, fissures and ulcers of the skin; asthma, sneezing, coughing and bronchial affections.	Remove from use of chemical. See Eczema.
84 **Pyridine—** A colorless fluid of pungent and characteristic odor. Its homologues, pyridine basis.	In its manufacture out of coal tar and bone tar; in the use of denaturing spirits (shops for woodworking, gilding and hat manufacture).	In the form of vapor, through the respiratory organs. In a fluid state it acts on the skin of the hands and arms.	Catarrh of the mucous membranes; hoarseness, irritation and choking sensation in the throat; headache, vertigo, flaccidity and trembling of the extremities; difficulty of breathing and clonic convulsions; eczema of the hands.	Wearing of rubber gloves; instant removal of the patient from the poisonous atmosphere.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
85 **Rags and Paper—**	Papermaking.	Inhalation and contact with dust and dirt; also excessive moisture and poisoning by dyes and acid.	Anthrax, bronchitis, gastric catarrh, eczema, rheumatism, poisoning by acid fumes and dyestuffs, etc.	Treat symptoms.
86 **Silver, Nitrate of—**	Electroplating, photography, glassmaking and the manufacture of silver leaf.	By absorption, through the skin and mucous membranes, and as dust, through the respiratory system and alimentary canal.	Discoloration of the skin and mucous membranes, usually of bluish-brown color.	The discoloration of the skin may be removed with cyanide of potash.
87 **Stones and Earths—**	Workers in flint, granite, marble, silica, limestone, terra-cotta, brick manufacture, etc.	As dust, by inhalation.	Chronic bronchitis, asthma, tuburculosis.	See general index for article on consumption.
88 **Straw and Broom—**	Broommaking, hatmaking, mattingmaking, etc.	Irritation of the respiratory passages by fiber dust, poisoning by bleaching agents, as acids, lime and dyestuffs.	Eczema, chronic bronchitis.	Locally, ichthyol and zinc ointment.
89 **Street Dust—** Composed of such substances as manure, asphalt, soot, ashes, earths, disintegrated brick, granite and other pavement materials, sand, concrete, etc.		By inhalation, conveying germs to the lungs, and by local irritation of the eyes.	Conjunctivitis, bronchitis and nasal catarrh.	Boric acid solution to the eyes.
90 **Sugar—**	Refiners.	Excessive heat and moisture combined with inhalation of charcoal dust.	Skin trouble, affections of the lymphatic glands and boils.	

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
91 **Sulphur Chloride—** A thick fluid of brownish color and suffocating odor, fuming on exposure to the air.	Solvent for sulphur and fats; caoutchouc and patent rubber industry.	In the form of vapor, through the respiratory organs.	In contact with water and atmospheric moisture, it is resolved into hydrochloric acid vapor. The vapor of sulphur chloride is suffocating; if ingested, it excites vomiting.	Immediate removal of the patient from the poisonous atmosphere.
92 **Sulphur Dioxide, Sulphurous Acid—** Its anhydride is sulphur dioxide, in the form of gas; condensed it becomes fluid. The gas is of pungent odor and suffocating effect.	Roasting of sulphur-bearing ores; brick works, ceramic industry; manufacture of sulphuric acid, of ultramarine; extraction of bones, manufacture of glue and gelatine from bones; disinfection; refining of petroleum; manufacture of candles; bleaching of wax, silk and wool; chromium tanning (two-vat process); bleaching of straw hats and bristles; preserving wine and fruits; fumigating hops and casks with sulphur; ice machines; heating plants (burning of pyrite-bearing coal).	In the form of gas, through the respiratory organs.	In moderate concentration sulphurous acid is borne without inconvenience or injury; persons accustomed to the gas bear very well a proportion of .003 to .004 per cent. of sulphur dioxide in the air. Susceptible persons, at the beginning of their employment in an atmosphere containing sulphurous acid, manifest a transient irritation of the mucous membranes of the respiratory organs and of the eyes. In its seve action there is spasmodic cough with secretion of tenacious, often blood-tinged mucus. The protracted effect of a high degree of concentration is livid discoloration of the mucous membranes, bronchial catarrh, croupous angina of the bronchi and their branches and inflammatory areas in the lungs; disturbances of digestion.	Removal from the noxious atmosphere; admission of fresh air; artificial respiration; infusion of weak alkaline solutions (.05 to 0.1 per cent. liquor natrii caustica—solution of caustic soda).
93 **Sulphureted Hydrogen or Hydric Sulphide—** A colorless gas, having the fetid odor of rotten eggs.	Blast furnace plants, in granulating the slag; distillation of sulphur waters; ultramarine works; Leblanc soda and chemical factories; in the manufacture of the compounds of sulphur and phosphorus;	In the form of gas, through the respiratory organs, as pure hydric sulphide gas; often found in admixture with other gases; direct action on the conjunctiva.	In the less violent cases there are gastric distress, nausea, fetid eructations, irritation and inflammation of the conjunctiva; rarely, erosion of the cornea, formation of vesicles on the lips, irritating cough, headache and a sensation of giddiness. In long-	Before emptying of dung pits and the like, their contents should be thoroughly mixed with iron sulphate; the emptying should be effected by mechanical apparatus; safety ropes to be attached to the

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
	sulphur metals (manufacture and use); sulphide of soda and sulphide of barium industry (manufacture of sulphide colors and dyeing with these); the extraction of cellulose (straw and wood); in the waste waters of industries which make use of organic substances; sedimentation tanks of sugar works; precipitation of soda residua containing calcium sulphide; work in sewers, latrines and dung pits; illuminating gas plants; flax retteries; tanneries.		continued inhalation convulsions and paralysis occur. In severe cases there are contraction of the pupils, slowing of the pulse, impaired respiration, involuntary oscillation of the eyeball, gnashing of the teeth, tetanus. With a very high proportion of sulphureted hydrogen in the air a man suddenly falls, becomes unconscious and dies without convulsions (apoplectic form). Chronic Poisoning.—Conjunctival catarrh; a sense of pressure in the head and on the chest; headache, debility, vertigo, nausea, disturbance of digestion; sallow complexion and emaciation; slowing of the pulse; tendency to the formation of boils.	workman; prompt hoisting out of the unconscious workman; removal of the soiled clothing; artificial respiration; administration of oxygen; hypodermics of ether or camphor.
94 **Sulphuric Acid—** A colorless, odorless, thick, oily fluid.	Manufacture of sulphuric acid; accumulator factories (mold and charging rooms); burnishing of iron, steel, etc.; textile industry, hat factories; petroleum distillation; factories for the manufacture of powdered fertilizers.	In the form of vapor, through the respiratory organs; direct action on the skin.	Inflammatory diseases of the respiratory organs (acute and chronic catarrh), inflammation of the lungs; anorexia; decalcification of the bones; injury to the teeth through softening of the dentine. As a result of the bespattering of the skin with concentrated sulphuric acid there is severe pain, a whitish discoloration of the skin, becoming brownish, with reddening and swelling of the surrounding tissues; in cases of extensive scalds there are, ultimately, decomposition of the blood, formulation of ulcers of the duodenum, somnolence and even death.	

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
95 **Tar—** A product obtained by dry distillation, particularly of anthracite coal and lignite.	Manufacture of illuminating gas; coke ovens; tar works; tar product factories; plants for wood preserving; manufacture of roofing paper; use for concrete paving; painting of metals; as a fuel; bricquet factories.	Direct action on the skin; in the form of vapor, on the respiratory organs.	Tar itch, under the form of diffuse acne, eczema or psoriasis, primarily on the upper extremities, later also on the other parts of the body; not infrequently on the irritated portions of the skin there appear cancroid ulcers, especially of the scrotum (among chimney sweepers, paraffin and soot workers and briquetmakers). Together with the effect on the greater portion of the skin, there are also general symptoms: Loss of appetite, nausea, diarrhœa, headache, numbness, vertigo, besides disturbances of the urinary bladder (ischuria, strangury), also albuminuria and dropsy.	
96 **Tobacco—**	Workers in tobacco.	As dust, by inhalation.	Palpitation, vertigo, insomnia, cough, nausea, vomiting, diarrhœa, emaciation, conjunctivitis, tuberculosis, dysmenorrhea and a tendency to abortion.	Stimulants.
97 **Triton—** An explosive powder.	Blasting, etc.	By inhalation.	Same as Lydol.	See No. 59.
98 **Turpentine—** A mixture of various terebinthine hydrocarbons, differing in odor and in composition, according to the botanical species from which they are severally derived.	Manufacture of varnish, cement, lacquer, sealing wax, colors; tapestry printing; trade of decorator, lacquerer and house painter; as a cleansing agent in various industries.	In the form of vapor, it acts upon the mucous membranes; in a fluid state, it acts on the epidermis.	Irritation of the mucous membrane of the eyes, of the nose (catarrh) and of the upper air passages (hemming, cough, bronchial inflammation); salivation; besides, there are insensitiveness, giddiness, headache. Prolonged action of the oil causes irritation of the kidneys, and then these organs excrete urine having the odor of violets.	Treat symptoms.

Designation of the Substance.	Industry in which Poisoning Occurs.	Mode of Entrance into the Body.	Symptoms of Poisoning.	Special Measures of Relief.
			Severe irritation of the skin is excited, especially by the so-called pine oil (Russian oil of turpentine).	
99 Vanadium—	Cloth printing; photography; steel casting.	In the form of vapor, through the respiratory system.	Spasmodic cough, pulmonary congestion, pulmonary hemorrhage, nephritis, rhinitis, gastro-enteritis, bronchitis.	Treat symptoms.
100 Volatile Oils—	In the manufacture of flavoring extracts and perfumery.	As vapors, by inhalation.	Headache, dyspepsia, vertigo, ringing in the ears, inflamed eyelids, erythema.	Fresh air.
101 Wood—	Furniture making, etc.	Inhalation of dust and varnish solvents, sandpaper dust, floor-scraping dust, etc.	Swelling of the joints, bronchitis, rhinitis, asthma, skin troubles, acute nasal catarrh, nausea, vomiting, vertigo.	
102 Wool—	Woolen industry.	By inhalation of fiber dust.	Anthrax, bronchitis, nasal catarrh.	See No. 33.
103 Zinc—	Zinc platemakers, engravers, dry-cell battery-makers, brass founders and makers of zinc oxide or zinc white paint.	Through the respiratory system as a dust and as a vapor.	Same as brass.	See No. 15.

PART I OF BOOK XIII

Treats of the inorganic or mineral materials used in medicine, together with the definition, property and use of each.

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Book XIII

MEDICAL MATERIALS; THEIR PROPERTIES AND USES

PART I.

INORGANIC (MINERAL) MATERIALS.

Importance of Drugs.—Drugs have to-day a very wide and important claim to our attention from the fact of their wide application. Those in more common use should be understood by the laity, while a knowledge of the rarer drugs should be close at hand, should we wish to learn of them. Drugs are our friends, but, like friends, must be properly and carefully used; in cases where not so used they prove a detriment rather than a benefit.

All Nature Assists.—For purposes of healing nature gives her vital forces in the form of plants and animals. Those forms of nature without life lend their aid, and thus some very important remedies come from the mineral kingdom.

Divisions of the Subject.—Our subject is therefore divided into parts, depending upon the source. Part I deals with drugs from the inorganic kingdom; Part II treats of drugs derived from the organic kingdom, and Part III shall be devoted to animal juices and extracts. These latter are among the newer remedies and, though strictly speaking, they are of organic origin, they are especially prepared in or from the animal body. The application of the drugs shall be given. Formulæ are not given, but such as are in common use will be found carefully and fully written under "Medicinal Prescriptions," "Home Administration of Medicines," and elsewhere.

The first in alphabetical order of the INORGANIC MATERIALS is:

ALUM (Alumen).

Definition.—A double sulphate of potassium and aluminium.

Property.—It may cause vomiting. Locally it checks bleeding.

Use.—It acts as a styptic, astringent and emetic.

Manner of Using.—As an emetic a teaspoonful is the dose for a child and a tablespoonful for an adult, and it should be given in syrup. A lotion of alum and whiskey is very useful in the prevention of bed-sores.

AMMONIUM (Ammonium).

Definition.—The salts are derived from the gas, ammonia.

Property.—It stimulates the heart. Weak solutions excite the flow of gastric juice. It is an antagonist to acids.

Use.—It may be used in cases of fainting or in cases of heart failure. Weak solutions are used as a sub-acid.

Manner of Using.—The aromatic spirits may be used in water, a teaspoonful as a dose. It should be remembered that this affords but temporary relief. Locally the liniment is useful.

ARSENIC (Acidum Arsenosum).

Definition.—Occurs as a white powder or in dense masses of crystals.

Property.—It serves as a stimulant to the nervous system, and in small doses improves the appetite and digestion.

Use.—Its properties indicate its use. Its stimulant effect upon the nervous system is made use of in the treatment of St. Vitus' dance. Preparations are used locally.

Manner of Using.—The common form used internally is called Fowler's solution, which is used in doses as high as ten drops. For local use a concentrated preparation is employed. In all cases arsenic is to be used with extreme caution, as it is very apt to produce symptoms of poisoning.

BISMUTH (Bismuthi Subnitras).

Definition.—A heavy white powder.

Property.—It has a soothing influence on the gastro-intestinal or digestive tract. Locally applied it is sedative and exsiccant; that is to say, it dries up excretions.

Use.—In cases of diarrhœa large doses are employed for the astringent effect. Locally it is employed in the treatment of burns and in skin diseases, where there is secretion to dry up.

Manner of Using.—It may be taken as a powder or in mucilage of acacia.

BORIC ACID (Acidum Boricum).

Definition.—It appears as colorless, transparent six-sided plates.

Property.—The influence of boric acid is sedative and destructive to low forms of organized life.

Use.—As a sedative and antiseptic.

Manner of Using.—Internally it is given in the form of a powder. For external application a lotion is prepared by dissolving the acid in water.

CALCIUM (Calcium).

Definition.—A metallic substance, the oxide of which constitutes lime. Chalk is scientifically called the carbonate of calcium.

Property.—Some preparations are sedative, others are sedative and astringent. Lime water and chalk are astringent and alkaline.

Use.—Either freshly slacked lime or, better, chlorinated lime may be used as a disinfectant. Carron oil consists of linseed oil and lime water, and is useful in the treatment of burns. Prepared chalk on account of its soothing and astringent effects makes a very useful tooth powder.

Manner of Using.—For internal use lime may be given in the form of a syrup where its assimilation is desired. Lime water may be used as a spray, or may be taken internally. Added to milk it prevents curdling.

CHLORINE (Chlorum).

Definition.—A gaseous element of a greenish color and strong suffocating odor.

Property.—Chlorine has the property of destroying the various forms of bacteria.

Use.—Chlorine is generated in the sick room and used in its free state as a disinfectant. For commodes, for bed-pans, or for internal administration a solution of chlorinated soda is employed.

Manner of Using.—Chlorine is to-day but little used internally, its principal use being external, and depending upon its power to kill germs,

COPPER (Cuprum).

Definition.—A metallic substance used to a slight extent in medicine, more widely in the arts.

Property.—Copper is astringent and caustic.

Use.—Its use is dependent upon its properties, it being an astringent and caustic. Copper is sometimes added to pickles to make them of a bright green color. This fraud can be detected by placing a piece of steel or the blade of a knife in the liquor; if it contains copper there will be a deposit of metallic copper upon the steel in a few minutes. The amount of copper present would not be sufficient to cause symptoms of poisoning. A far more dangerous source is the pigment found in wallpaper made of copper arsenite, which is very poisonous. This imparts to the wallpaper its green color.

Manner of Using.—Copper should always be used with caution, and never without the advice or direction of a physician. When used internally a salt known as the sulphate is used. Externally its caustic action is effected.

GOLD (Aurum).

Definition.—A well-known precious metal. On account of its high place among the metals gold was supposed to have some special value in medicine. As a matter of fact it is but little employed.

Property.—Its chief property is to stimulate the glands of the stomach and liver. It acts also upon the kidneys, increasing the flow of urine.

Use.—It is used for its general stimulary effect on the system and for its stimulant effect on the liver and stomach in particular.

Manner of Using.—The preparation used is an orange-colored powder made of equal parts of sodium chloride or common table salt and gold chloride. The dose for internal administration is minute.

HYDROCHLORIC ACID (Acidum Hydrochloricum).

Definition.—A metallic acid sometimes called muriatic acid or spirit of salt.

Property.—Dilute hydrochloric acid excites or stimulates the flow of secretions of the digestive tract and thus promotes appetite and digestion.

Use.—In dyspepsia due to insufficient amount of hydrochloric acid, the dilute acid is of value.

Manner of Using.—The dilute acid is used in drop doses freely diluted with water.

IRON (Ferrum).

Definition.—The most useful, widely distributed and abundant of all the metals.

Property.—Being a normal or natural element of the blood, iron and its preparations have the property of building up the blood and tissue wornout by disease. Iron has also a tonic effect on the nerves.

Use.—In cases of anemia or lack of blood the various preparations of iron are employed to replace the loss. In convalescence from disease iron is of distinct value when given in small doses over a long period.

Manner of Using.—Locally the tincture of the chloride is astringent. Care must be taken whenever iron or its preparations are used locally about the throat or taken internally in liquid form that they do not come in contact with the teeth. Internally iron may be given in pill form or as a solution.

MAGNESIA.

Definition.—A metallic substance, four preparations of which are used generally in medicine.

Property.—Magnesia being an alkaline substance is antagonistic to acids. It is also laxative.

Use.—The laxative property is marked in the oxide of magnesia and in the sulphate of magnesia or epsom salt. The citrate is laxative. The oxide is a useful antacid.

Manner of Using.—The sulphate or epsom salt is readily soluble in water. A teaspoonful is sufficient for most people as a purgative, though a tablespoonful would do no harm. Magnesia can be used in doses as high as a teaspoonful to two teaspoonfuls for an adult. For young children the dose is ten to twenty grains. The citrate of magnesium is a pleasant purgative in liquor form.

MANGANESE (Manganum).

Definition.—A metallic substance, two preparations of which, the dioxide and the sulphate, are used in medicine.

Use.—Manganese is used in the same cases as iron.

MERCURY (Hydrargyrum).

Definition.—A heavy fluid, with a silvery lustre and free from odor or taste.

Property.—Mercury in small quantities acts as a tonic, improving the condition of the blood. It is sometimes called an alterative from the fact that it alters or changes the state of the system.

Use.—Its use is that of a tonic, but should always be used advisedly. The preparation called corrosive sublimate, which is the bichloride of mercury, has no equal as an antiseptic. Calomel and blue mass are valuable as laxatives.

Under the name quicksilver we recognize the mercury used in the arts, as to manufacture thermometers and mirrors.

Manner of Using.—Corrosive sublimate should be used only externally without a physician and with great caution, as it is very poisonous. Blue mass pill may be given as high as five grains. Calomel is best taken in small amounts, but this, too, should be used with caution.

NITRIC ACID (Acidum Nitricum).

Definition.—One of the metallic acids occurring as a colorless, fuming liquid.

Property.—Locally the application of nitric acid is followed by destruction of tissue. Taken internally it is an astringent.

Use.—The local effects are made use of in the employment of the acid as an escharotic. Internally it is used where astringent results are desired, as in diarrhœa.

Manner of Using.—The strong acid is used locally, but for internal use only small quantities are used and very well diluted.

OXYGEN (Oxygen).

Definition.—A gaseous element forming one-fifth of the atmosphere.

Use.—Being a vital part of the air we breathe it is used in diseases of the heart and lungs associated with great difficulty in breathing.

Manner of Using.—It is usually kept in tight cylinders ready for use. It is used by inhalation.

PHOSPHORUS (Phosphorus).

Definition.—A yellow wax-like substance obtained from bones. It has the odor of garlic.

Property.—Phosphorus acts upon the nervous system and upon the bones.

Use.—In disease of the bones, dependent upon defective nutrition, phosphorus is of great value. In those nervous diseases dependent upon nerve exhaustion, rather than organic disease, phosphorus is employed with benefit.

Manner of Using.—Phosphorus is given in the form of pills or as a liquid preparation. Poisonous effects quickly follow an over-dose.

SILVER (Argentum).

Definition.—Another of the precious metals. It is much more extensively used than the metal with which it is so often associated.

Property.—The preparation of silver that is most often used and the only one to be considered in this work is the nitrate of silver, or, as it is called, lunar caustic.

Locally and internally lunar caustic is astringent in its properties. The mark made externally is white, but this subsequently becomes black on exposure to light. Solutions of this substance behave in the same manner.

Use.—Locally the astringent or even caustic property of the drug are made use of in the destruction of exuberant granulations forming what is commonly called proud flesh. A solution of thirty grains to a pint of water painted on the finger will absorb a felon. Internally also the drug is used for its astringent action on the gastro-intestinal tract.

Manner of Using.—Internally minute doses are used. For external applications solutions are employed and are made of varying strength, depending upon the particular need.

SODIUM (Sodium).

Definition.—This element is not used by itself in medicine, but certain of its salts are well known and widely employed.

Property.—Sodium hydrate or caustic soda, as its name implies, is a caustic. Bicarbonate of soda is a sedative when used externally. Internally it is antagonistic to acids, hence is said to be antacid. Borax or

sodium-borate is used internally, but is liable to disturb the stomach. It is sedative in its action. Sodium chloride or table salt is an important part of our food. Sodium phosphate is mildly purgative in its action. Sodium sulphate or Glauber's salt is a powerful purgative.

Use.—Bicarbonate of soda is much used in dyspepsia. When given a few hours before meals it stimulates the flow of gastric juice. When given an hour or so after meals it serves to neutralize fatty acids which are products of faulty digestion. Sodium chloride in solution is much used to-day injected in the bowel or under the skin.

Manner of Using.—All the salts are soluble and should be taken internally in solution, in doses to meet the requirements of each case.

SULPHUR (Sulphur).

Definition.—A lemon yellow-colored substance, brittle, tasteless and without odor. It is found native in Sicily and Iceland in the neighborhood of extinct volcanoes.

Property.—Locally applied, sulphur is a stimulant to the skin and a parasiticide. Internally its acts favorably, so changing the nutrition of the person that it is called an alterative. This drug has long been famed as a medicine needed by the young in the spring time.

Use.—The preparation known as compound licorice powder is a mild laxative. In cases of disordered nutrition sulphur oftentimes acts most favorably. The fact that sulphur is absorbed into the blood from the small intestine is shown by the effect upon silver coins or jewelry work by persons taking it. The effect or results is a beneficial one upon the blood, hence in cases where the blood is deranged or below par, sulphur is useful.

Manner of Using.—Internally sulphur is taken in solution. It may be taken in syrup or molasses. Externally it is best applied in ointment.

SULPHURIC ACID (Acidum Sulphuricum).

Definition.—A heavy oily liquid without odor, but with a strongly acid taste. It is sometimes called oil of vitriol.

Property.—Sulphuric acid is astringent and antiseptic when taken internally. Locally its acts as an escharotic.

Use.—Its properties indicate its use. It is an escharotic, internal antiseptic, astringent and tonic.

Manner of Using.—Sulphuric acid should be used well diluted and always advisedly taken.

PART II OF BOOK XIII

Treats of the Inorganic (Vegetable) Materials used in medicine. Superb colored illustrations of eighty-four plants, fruits and vegetables are also to be found in this chapter.

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MEDICAL MATERIALS

PART II.

ORGANIC (VEGETABLE) MATERIALS

The materials of this group are far more numerous than those of the preceding group. They will be found arranged according to their common names, the scientific names in most cases being given.

ACETANILID (Acetanilidum).

Definition.—A white, crystalline substance, made from acetic acid.

Property.—It is sedative to the nervous system; causes a lowering of the temperature associated with free sweating.

Use.—It is employed in the treatment of spasms, for the relief of headache and to reduce temperature in mild cases of fever.

Manner of Using.—May be used as the powder or in the form of a tablet or capsule, five grains being the usual dose.

ACETIC ACID (Acidum Aceticum).

Definition.—A colorless liquid with a vinegar-like odor.

Property.—It checks hemorrhage locally, also has a soothing local effect. Taken internally it produces a cooling sensation.

Use.—It is useful as an antagonist to scurvy, as a refrigerant in mild cases of fever and locally for its soothing properties in sunburn. It acts also as a styptic.

Manner of Using.—The dilute acid is the safe preparation and may be used in amounts from one to two teaspoonfuls.

ACONITE, MONKSHOOD (Aconitum).

Definition.—Aconite is the root of a plant growing in Europe. The root is conical in shape, two or three inches long, and closely resembles

horseradish. When slowly chewed it produces a sensation of warmth, slowly followed by numbness.

Use.—Aconite is sedative in its effects, and in accordance with this property it is employed locally in neuralgia. It is used also in cases of vomiting. Its principal action is upon the circulation, its effect being to slow the pulse.

Manner of Using.—The tincture of aconite is the preparation usually taken internally. The dose is very small, and even then poisonous symptoms are prone to develop.

AGUE ROOT (Aletris Farinosa).

(See Plate I.)

Height, from a foot to eighteen inches; leaves, pale and smooth; bears white flowers; grows mostly in sandy soils. It has proved useful in dyspepsia and flatulent colic, and is especially useful for the purpose of restoring the activity of the generative organs, giving them vigor and healthy action. A valuable agent to prevent tendency to miscarriage and falling of the womb. The dose of the tincture is from six to ten drops three times a day, or can be used in pill form.

ALCOHOL, SPIRIT OF WINE.

Definition.—Alcohol is a transparent, colorless liquid obtained from the distillation of fermented saccharine material. For use in medicine, whiskey should be at least two years old and wine at least four years old. Wine is made by fermentation without distillation. Red wine differs from white wine in that in the production of the former the skins of the grape are used. Malt liquors—ale, beer, porter, are produced by fermentation of malt and hops and contain nutritive material.

Use.—When taken internally in small amounts and at meal-time the effect of alcohol is to stimulate the glands of the stomach to greater secretion. The presence of alcohol in the stomach, however, retards digestion, so that if much be taken it is a detriment rather than an advantage.

As a result of the long-continued use of alcohol, changes take place in the coats of the stomach. The inner lining of the stomach loses its delicacy and becomes thickened. It can no longer secrete as formerly, and indigestion results. Upon the heart and circulation alcohol is a decided stimulant. It strengthens the heart, it enlarges or dilates the blood-vessels and hence the flushed face of the one addicted to alcohol. Alcohol by its stimulant action enables the system to pass through great strains, but if its use is prolonged beyond the period of actual need it

is followed by its harmful effects. These latter manifest themselves by changes in the stomach, liver and kidneys and blood-vessels, and consist essentially of a hardening of these organs, rendering their functions imperfect. Alcohol does not increase the heat of the body, as some suppose. By actual experiment it is found that by dilatation of the capillaries it leads to a loss of heat. It is found, for instance, that those explorers in the Arctic region who avoid alcohol can better endure the trials of those regions than those who indulge.

Manner of Using.—A discussion of this portion scarcely seems necessary. Much depends upon the person. There are many persons who cannot take even the malt liquors, which contain but from three to five per cent. of alcohol. On the other hand, we have abundant examples of men who have indulged in alcohol and yet whose health seems not to be greatly impaired by such indulgence. From the physical standpoint alone it may be said that people, especially young people, do not need alcohol in any form. Their system does not require it. In disease its benefits are undoubted, and, it may be added, are greatest to those to whose system it is a stranger.

ALLSPICE (Pimenta).

Definition.—Allspice represents a fruit.

Use.—It is employed chiefly to promote appetite and digestion. It may be used to disguise the taste of unpalatable drugs and is one of the ingredients of spice plasters.

Manner of Using.—Internally, the oil is the preparation used in drop doses.

ALMOND (Amygdala).

Definition.—There are two varieties of almond—the bitter almond and the sweet almond.

Use.—There are two oils of almond, one, the oil of bitter almond, is used in minute doses, the other, known as the expressed oil of almond, may be used in large doses, *i. e.*, as high as a tablespoonful. It is quite important that these two oils should not be confused. Expressed oil of almond and mixture of almond are bland and soothing for local application.

Manner of Using.—Locally or internally, as already indicated.

ALOES (Aloe).

Use.—The dry juice is medicinal and one of the best laxatives for promoting and righting the action of the colon or large intestine. It excites the circulation of the blood in the organs of the pelvis, and is invaluable in promoting the menstrual flow—in this case it is generally combined with iron and myrrh. It is used for chronic costiveness, but those that suffer from piles should not take it. By reason of its tendency to increase the menstrual flow it ought not to be used during menstruation, especially by those having naturally an abundant flow. It should be avoided during the period of pregnancy. The dose is from two to five grains, generally in pills, combined with other drugs.

ANISE (Anisum).

The virtues of this drug depend upon the warming effect when taken into the stomach. As it has a pleasant odor and taste, it is much used in cases of colic in young children.

ARNICA, LEOPARD'S BANE (Arnica).

Definition.—The preparations of arnica are obtained from arnica flowers and arnica root. The flowers are orange-yellow, dish-shaped, with rays.

Use.—Arnica is used in domestic practice, but very little by physicians. The tincture is usually employed in cases of spasms, bruises and for rheumatic pains. Taken internally, in small doses, it produces a sensation of warmth over the body and increases the secretions.

ASAFETIDA (Asafœtida).

Use.—The dry juice of this plant is a powerful stimulant in many nervous affections, particularly in women. Its most frequent use is in the treatment of hysteria. The ordinary dose is from two to five grains. From fifteen to twenty drops of the tincture may be given as a dose.

BALSAM APPLE (Momordica Balsamina).

Part used—fruit and seeds.

A liniment formed by infusing the fruit in olive oil is applied to burns, old sores, piles, prolapsus ani, and so forth, and the fruit itself is

mashed and used in the form of poultices. An extract prepared from it is useful in dropsy in the dose of from 5 to 15 grains.

BEAN.

Those who have tried the white navy bean as a cure for erysipelas say it furnishes a sure cure if the disease is taken in time. The beans should be boiled soft and applied as a poultice to the affected parts. Renew frequently.

BEET (Beta Vulgaris).

Whenever tried the juice of the common beet has been found a remedy for gravel. Boil the beets till thoroughly done. Remove the beets and boil the juicy water again till it assumes the form of a syrup. Take a cupful three or four times a day. Pursue the treatment till the stones pass. This beet syrup is also especially recommended for suppressed or tardy menses.

BENZINE (Benzinum).

Definition.—Benzine represents a purified distillate from American petroleum. It is a clear, colorless, diffusible liquid. Its vapors, when mixed with the air, are explosive; hence it should be kept in a cool place remote from light or flame.

Use.—Benzine is not used internally in medicine. Externally benzine is used as a counter-irritant. It may be applied by rubbing, or upon a flannel cloth.

BENZOIN (Benzoinum).

Definition.—Benzoin is a gum resin obtained by incisions made into the bark of a tree growing in the East Indies. It occurs in large masses.

Use.—The medicinal preparation of opium known as paregoric contains some benzoin. The tincture of benzoin is useful as an expectorant. The compound tincture is useful for local application as a protectant to excoriated surfaces. Benzoin prevents fat from becoming rancid.

BITTER ASH (Bittera Febrifuga).

A tree indigenous to the West Indies. The bark is the part used. A decoction is made with one ounce to a pint. Dose: A tablespoonful four times a day. Has been found most useful in intermittent fever, for which it is claimed to be almost a specific.

BLACK MUSTARD (Sinapis Nigra).

(*See Plate V.*)

BLACK SNAKEROOT (Cimicifuga).

Definition.—Cimicifuga represents the rootlets of the plant.

Use.—Upon the nervous system it acts as a sedative. It is claimed that it is of value in rheumatic affections of the muscles.

Manner of Using.—A prēparation known as the fluid extract is usually employed and taken in small and repeated doses. A tea of the root, drunk freely, is used in rheumatic affections.

BONESET.

This plant is indigenous of and is found in most parts of North America. The tops and leaves are medicinal. They should be made into an infusion which is generally known as boneset tea. It is a tonic, diaphoretic, expectorant, and when taken in large doses or warm it acts as an emetic and aperient. The extracts of boneset may be purchased at drug stores. The fluid dose is from one to two drachms. With the solid extract the dose is from one to one and one-half ounces and that of the infusion from one to two ounces.

Two scruples of eupatorin (boneset), one scruple of xanthoxylin and one-third grain of strychnia mixed and made into twenty powders, one powder being taken three times a day, is recommended for torpor of the liver or kidneys and also for rheumatism.

BUCHU (Buchu).

Use.—This is one of the best known remedies to soothe the irritation of the urinary organs. It has been used for catarrh of the bladder and in cases of pain in urinating. Best results are obtained from the infusion made from one ounce of the leaves in two pints of boiling water. Two or three soup-spoonfuls four or five times a day. There is also an extract, which dose is from a half to one teaspoonful.

BURDOCK (Lappa Minor).

Root spindle-shaped, about a foot in length. Flowers purple and seeds quadrangular. The root is the part employed, and in venereal and cutaneous diseases supplants mercury, the iodides and arsenic, eliminating

very rapidly the specific poison from the blood. Best administered in decoction by boiling two ounces of the root in three pints of water to two, and given in the dose of a tablespoonful four times a day.

CAFFEINE (Caffeina).

Definition.—Caffeine is prepared from the dried leaves of the thea sineusis or from the dried seeds of coffea arabica. It occurs also in other plants. It exists in the kola nut of Africa. Caffeine is in the form of colorless silky crystals.

Use.—Caffeine stimulates the nervous system. It quickens the intellect and causes sleeplessness. It causes an increase in the flow of the urine. It is used to stimulate the heart, to increase the flow of urine, and combined with other remedies it is of value in relieving headache of nervous origin.

Manner of Using.—The preparation used is known as citrated caffeine. It is given in powder form.

CALABAR BEAN (Physostigma).

Definition.—Physostigma is the seed of the physostigma venanosum, growing in Western Africa, along the River Niger.

Use.—The chief action of the drug is to depress the spinal cord, and in accordance with this action it is used to produce quietude in cases of convulsion, as from strychnine poison, from tetanus, and so forth.

CALAMUS, SWEET FLAG (Calamus).

Calamus is used as a substitute for tobacco by those habitual to the weed. It is a constituent of various bitters used to stimulate and promote the appetite.

CAMPHOR TREE.

The uses of camphor in medicine are numerous. It affords one of the safest and surest of household remedies for headache, spasms, neuralgia, gout, rheumatism and general debility. It is equally efficacious as an external remedy for pains, sprains, chilblains, bruises and flesh soreness. In such cases the tincture is generally used, and it can be made at home by mixing an ounce of the gum with a pint of pirits. It affords a speedy remedy for colds, in the form of a drink made of one pint of hot water into which ten drops of the spirits of camphor has been dropped. It should be sipped slowly and as hot as can be taken.

CARBOLIC ACID (Acidum Carbolicum).

Definition.—Carbolic acid is made from coal-tar. It occurs in the form of colorless crystals, but exposure quickly converts it into a colorless or slightly reddish liquid.

Property.—A slight fall in temperature follows the use of carbolic acid. Its chief action depends upon its property of destroying low forms of germ life.

Use.—By virtue of its properties it is used as an antiseptic and internally as an antiferment.

Manner of Using.—Two or three drops may be taken internally, best given with a powder of bismuth. Locally it is used in solutions of various strength, the usual being 5 per cent.

CARDAMON (Cardamon).

This drug represents a fruit. It is an agreeable vehicle for disguising the taste of other drugs, and it also produces a sensation of warmth in the stomach.

CASTOR OIL (Ricini Oleum).

Definition.—Castor oil is a fixed oil expressed from a seed. It is a pale yellow liquid, having a faint odor.

Use.—Castor oil is a slow purgative, producing copious liquid stools. It stimulates the bowels.

Manner of Using.—The dose for an adult is half to one ounce; for a child, one to two drachms.

CAYENNE PEPPER (Capsicum Annuum).

The stem is thick, smooth and branching, about three feet in height. The fruit is of a bright scarlet color and contains numerous kidney-shaped, whitish seeds. A powerful stimulant. Employed with great advantage in la grippe. Two tablespoonfuls of the powder, with a teaspoonful of common salt, infused for an hour in a pint of boiling water with half a pint of vinegar. This is strained and a teaspoonful given every hour. The same is useful as a gargle. In scarlet fever the same infusion diluted gives much relief and is of positive advantage. Dose: The same.

CELERY (Opium Graveoleus).

Various medicinal preparations of celery are used in the treatment of chronic rheumatism. The same result is reached by drinking freely

(*Continued on page* 1442.)

Fruits, Vegetables, Herbs, Roots

AND

Plants Valuable in Medicine

How to Prepare Them
Their Uses

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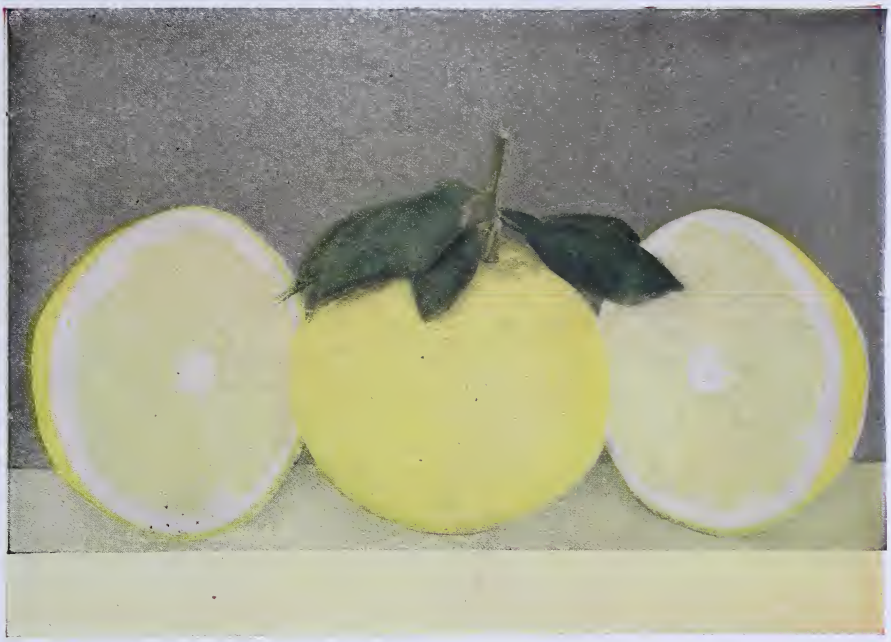
THE LEMON (*Citrus Limonum*).

Treatment for twenty-seven diseases. See page 1451.



GRAPE-FRUIT.

Mild astringent. Soothing to the stomach in cases of flatulence and dyspepsia.

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APPLE.

Gentle laxative. Eaten regularly, apples keep the stomach and bowels in good condition.

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OREGON WILD GRAPE.

Used in leucorrhea and as a blood purifier. See page 1458.

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GRAPE.

Used in dropsy and chronic dysentery. See page 1448.

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ASPARAGUS.

Used for the kidneys. See page 1414.

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BEET (*Beta Vulgaris*).

Used in gravel. See page 1389.

ONION.

Used in six diseases. See page 1458.

PUMPKIN (*Cucurbita Pepo*). ©E. J. S.

Treatment for worms, retention of urine and inflammation of bladder and bowels. See page 1462.

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TOMATO (*Lycopersicum Esculentum*).

Treatment for Cholera Infantum. See page 1469.

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CELERY (*Opium Graveolus*).
Used in Chronic Rheumatism. See page 1392.

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RED PEPPER.

Used as a gargle in Scarlet Fever and as a tea in the Grippe. See page 1462.

MEDICINAL PLANTS

PLATE I.

Chittim Bark.—A shrub about seven or eight feet in height, with branches terminating in a sharp spine. The leaves, on short footstalks, ovate and veined. The bark is officinal and the part employed. It stands without an equal in the treatment of constipation in all its varied forms. An infusion of one ounce of the bark to a pint of boiling water; infuse for one hour and strain. Dose: One teaspoonful, morning and evening, according to symptoms or until the bowels are thoroughly regulated.

Stone Root.—This plant is used in numerous complaints in practice. A decoction of the fresh root, one ounce to the pint of water, has been used with advantage in hemorrhoids or piles, catarrh of the bladder, gravel and dropsy. The dose is one tablespoonful four times a day. The leaves are applied in the form of fomentation to wounds, bruises and sores, and in cases of internal abdominal pains.

Santal Wood.—White Sandalwood is a small tree indigenous to India. The volatile oil distilled from the wood is the part used. Given internally in moderate doses of 5 to 10 drops for gonorrhea. It is sometimes used as a stimulant to the respiratory tract in bronchitis and certain forms of asthma.

Ague Root.—Height, from a foot to eighteen inches; leaves, pale and smooth; grows mostly in sandy soils. It has proved useful in Dyspepsia and flatulent colic, and is especially useful for the purpose of restoring the activity of the generative organs, giving them vigor and healthy action. A valuable agent to prevent tendency to miscarriage and falling of the womb. The dose of the tincture is from six to ten drops three times a day, and of the powdered root five to eight grains.

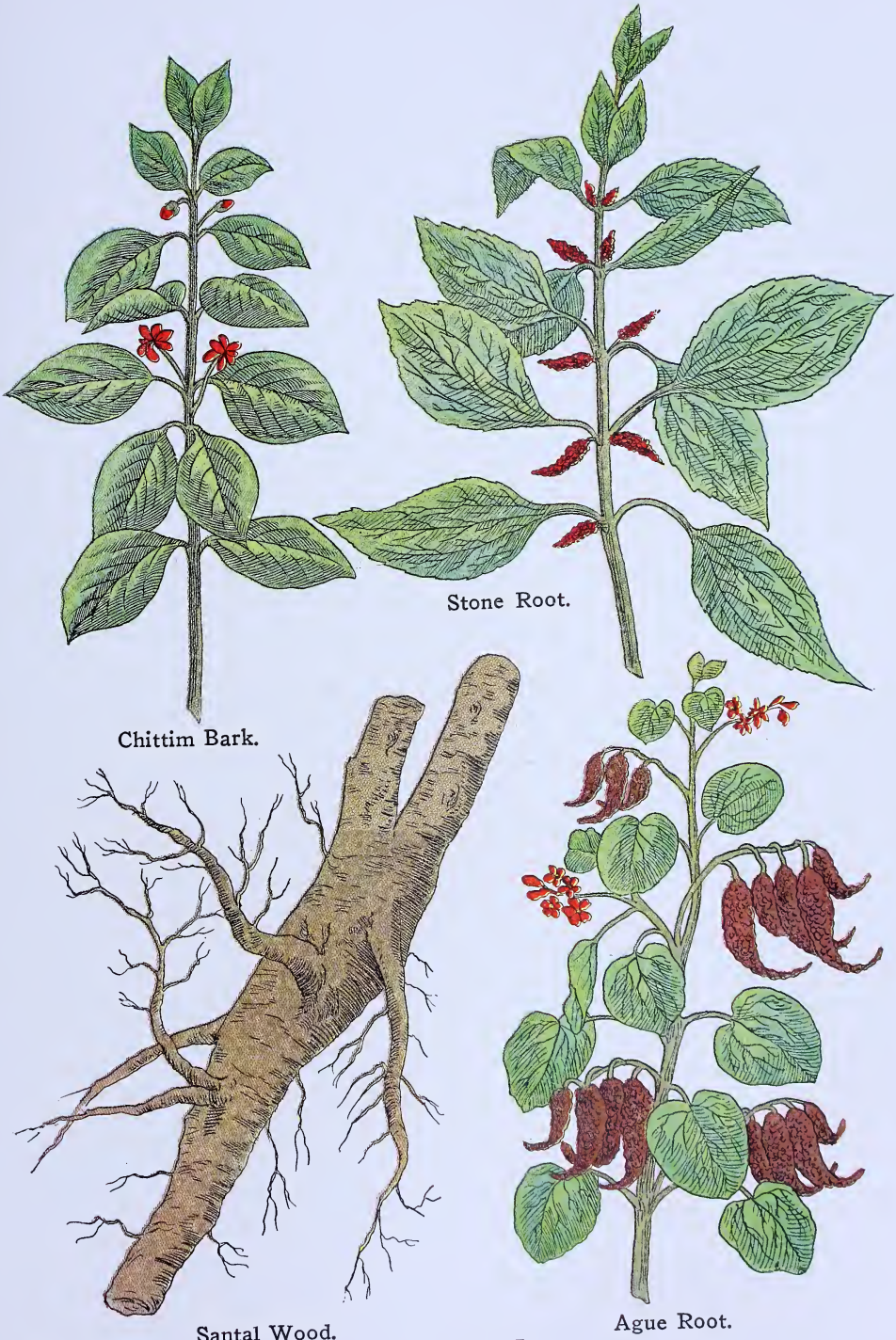

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PLATE I.

MEDICINAL PLANTS

PLATE II.

Saffron.—This plant is common in orchards and of a deep orange color. It is used as an infusion (tea); boiling one ounce of leaves in two pints of water. It is a pleasant home remedy in the beginning of scarlet fever, measles and chicken-pox, serving to bring out the eruptions. Dose, from half to a whole wineglassful, three times a day. It is also good as a gargle in sore throat.

Yellow Goat's Beard.—A tea of the root, bark and leaves of this plant is used for diarrhœa in children. Boil one ounce of root in two pints of water. Take two or three tablespoonfuls three or four times a day.

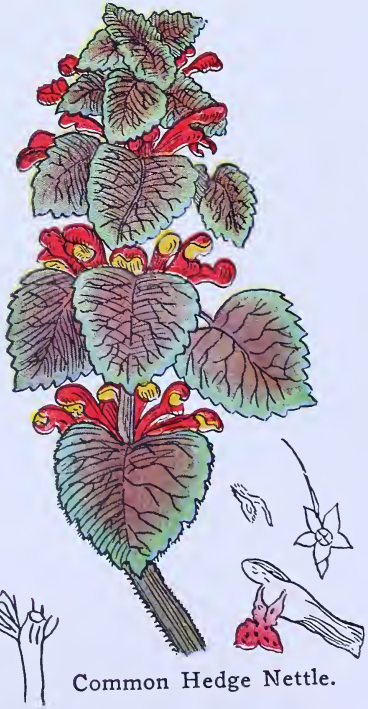
Hedge Mustard.—Used cooked for table purposes as a stimulus to the stomach and to relieve coughing. Also used in the form of an infusion (tea) to cleanse ulcers and wounds. Boil an ounce of seeds, or a quantity of leaves, in a quart of water and wash the sore parts twice a day.

Common Hedge Nettle.—Made into a tea and drunk freely is excellent for hemorrhages of lungs and stomach. In doses of half a wineglassful four times a day it relieves neuralgia. A poultice of the leaves also relieves neuralgic pain and aids in the cure of wounds. Used at times as a tea, and drunk in wineglass doses twice a day, to promote menstruation and kill worms.

Saffron.

Yellow Goat's Beard.

Hedge Mustard.



Common Hedge Nettle.

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MEDICINAL PLANTS

PLATE III.

Cathartic Ramno.—A tea of the bark, taken in tablespoonful doses, three times a day, opens the bowels. But caution is needed, lest it lead to purging.

Fennel.—The seeds and leaves in the form of a strong infusion (tea) are excellent for colic. The seeds in form of a powder are also good for cramps. Dose of the tea, a wineglassful, repeated at half-hour intervals, if necessary. Dose of the powdered seeds, ten to twenty grains.

Tansy.—Tansy tea, in doses of a teacupful twice a day, promotes menstruation. In the form of bitters, it strengthens weakened constitutions. Cold tansy tea, drunk freely, is good for dyspepsia.

Wood Sorrel.—A poultice of the leaves was once a popular application in cases of cancer. Sorrel tea, drunk freely, also aids in giving relief to cancerous affections.

Cathartic Ramno.

Fennel.

Tansy.

Wood Sorrel.

© E. J. S.

PLATE III.

MEDICINAL PLANTS

PLATE IV.

Stavesacre or Lousewort.—The crushed seeds, made in a paste and rubbed on the head, is an effective way to kill lice.

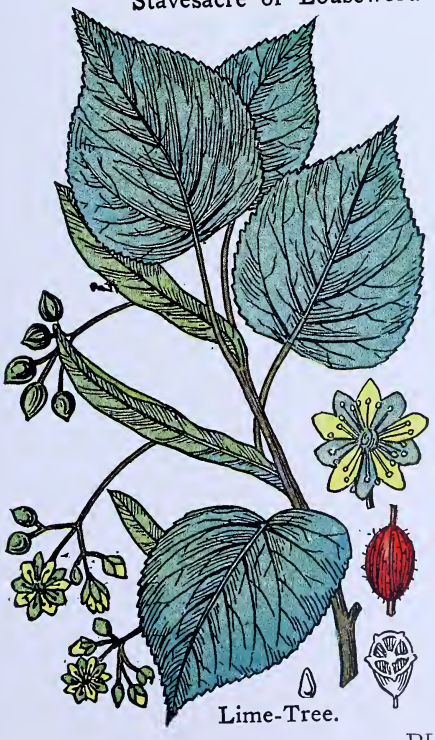
Golden Thistle.—A tea of one ounce of leaves or stems to two pints of water will relieve colic. Dose, a wineglassful, repeated every half-hour, if necessary.

Lime-Tree.—The juice of the lime, mixed with water, is a refreshing drink, in frequent sips, for fever sufferers. Lime juice in large quantities is carried on board ships as a preventive of scurvy.

Red-Berried Trailing Arbutus.—A strong tea, made of one ounce of the leaves to a quart of water, and taken in doses of two tablespoonfuls three times a day, is used to relieve bladder trouble. It diminishes the irritation caused by the urine, and the inflammation and pain.

Stavesacre or Lousewort.

Golden Thistle.



Lime-Tree.

Red-berried Trailing Arbutus.

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PLATE IV.

MEDICINAL PLANTS

PLATE V.

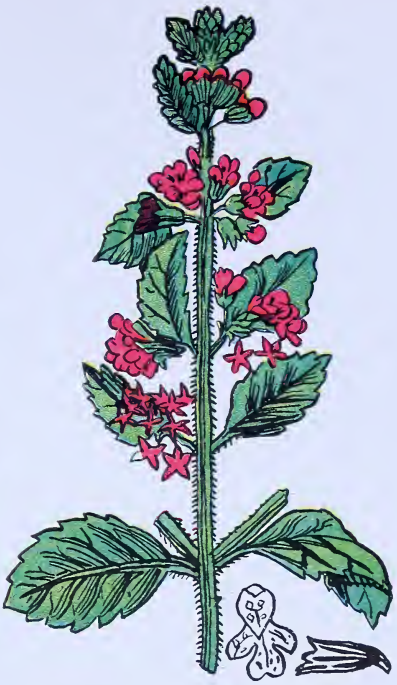
Henbane.—This plant, like belladonna, is a powerful poison. It is used in the form of an extract to soothe pain. Dose, one-eighth to one half a grain once or twice a day. It is frequently used in cases of delirium, where opium cannot be used. Great caution is needed in its administration.

Mountain Balm or Calamint.—Make a tea of the root, dilute with water and sweeten. Give in teaspoonful doses at intervals of half an hour to relieve wind colic in children.

Sage or Salvia.—Sage tea, either alone or mixed with vinegar, honey or alum, is an excellent gargle for sore throats. Drunk freely it cures night-sweats. Simmered in lard and taken four or five times a day in doses of two spoonfuls each cures quinsy.

Mustard.—Powdered mustard seeds are used on the table and in medicine. One or two teaspoonfuls in a glass of hot water is used to provoke vomiting. If necessary, repeat the dose till the desired result is reached. Mustard in the form of plasters or poultices soothes pain and promotes circulation. Mustard seeds, in doses of a teaspoonful three times a day, relieves dyspepsia. Mustard plasters, applied to the extremities, serve to bring out again the eruption where it has gone in, in such cases as measles and scarlet fever.

Henbane.



Mountain Balm or Calamint.

Sage or Salvia.

Mustard.

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PLATE V.

MEDICINAL PLANTS

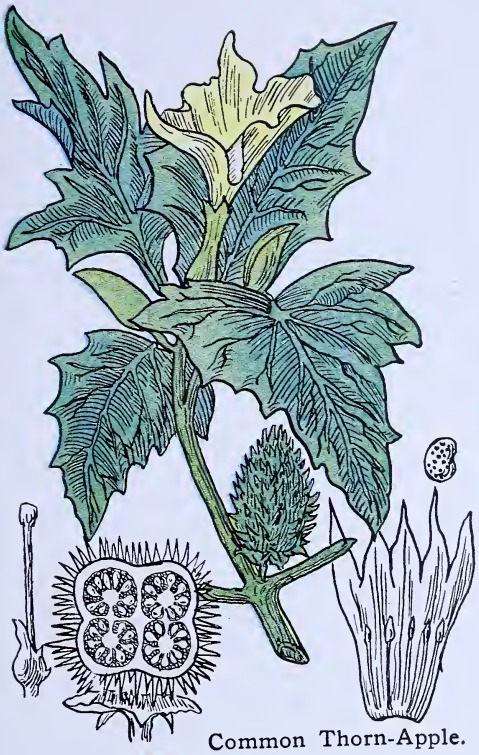
PLATE VI.

Common Thorn-Apple.—This plant belongs to the same family as henbane and belladonna. Cigarettes made from the dried leaves, and smoked, are good to calm asthma difficulties.

Asparagus.—Used as a table dish gently stimulates the kidneys. In the form of tea, drunk at three or four hour intervals, it promotes a free flow of urine.

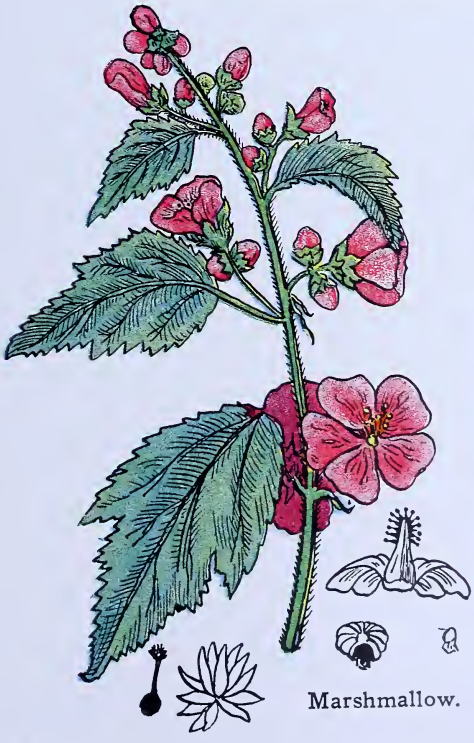
Marshmallow.—The powdered root may be used as a poultice in cases of gangrene. A fresh infusion (tea), drunk freely, is of service in children's diseases, and especially in Bright's disease. Marshmallow drops are useful in sore throat, in scarlatina and diphtheria. The dose is indefinite. An infusion, drunk freely, is good for acute gonorrhea, and all affections of the mucous membrane of lungs and bowels, and inflammations of kidneys and bladder.

Hops.—The root, used as a powder or pill, soothes the irritation of the urinary organs and pains of gonorrhea. Infusion of hops, or hop tea, is made by taking a tablespoonful of hops to a pint of water and is given in doses of two to five ounces, twice to three times a day. In delirium tremens hop-tea quiets drink craving and settles the stomach. In insomnia and restlessness it is useful in producing sleep. A hop poultice gives relief in local painful affections. Or the hops may be placed in flannel and moistened with hot whiskey and applied to painful cases, as in toothache or earache, where the warmth and steam are very soothing. The inhalation of the vapor of hops is often attended with good results, especially in diseases of the throat and chest.



Common Thorn-Apple.

Asparagus.



Marshmallow.

Hops.

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MEDICINAL PLANTS

PLATE VII.

Common Scurvy-Grass.—This plant is popularly eaten as a salad and is useful in scurvy, chronic rheumatism and chronic malaria. The juice has been used externally for the purpose of stimulating indolent ulcers and, diluted with water, as a mouth-wash for spongy gums and ulcers of the mouth.

Meadow Saffron.—Saffron-tea, drunk freely, is used in domestic practice to bring out the eruption in measles and scarlet fever and to cause sweating. Externally it is used in bruises, rheumatic and neuralgic pains and in the form of ointment for bleeding piles.

Garlic.—Garlic, onion and leek are used in bronchitis and chronic cough. Here it can also be applied to the chest in the form of a poultice, or the oil can be used externally. A garlic poultice may also be successfully employed in convulsions and intestinal and stomach troubles of children. Garlic is also given for worms. It is a domestic remedy in whooping-cough. Syrup of garlic is given in doses of five drops to a teaspoonful, two to three times a day, or oftener, if the coughing spells are frequent and violent.

Horse-Radish.—Used as a tonic for the digestion, and to promote the secretion of the kidneys. Syrup of grated horse-radish and honey or sweetened water, taken in teaspoonful doses every hour, will cure hoarseness. Horse-radish tea, drunk freely, is beneficial in rheumatism and neuralgia.

Common Scurvy-Grass.

Meadow Saffron.

Garlic.

Horse-Radish.

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PLATE VII.

MEDICINAL PLANTS

PLATE VIII.

Common Juniper.—By boiling an ounce of the berries (pounded) in two pints of water an infusion is obtained which stimulates the action of the kidneys. A pint is drunk through the day in Bright's disease with its attendant dropsy. The juice of the berries has been successfully used in doses of two or three teaspoonfuls daily in children to promote the secretion of urine. The oil may be dropped in boiling water and inhaled to produce the same effect.

Currants.—The juice of the berry, boiled and sweetened, and in teaspoonful doses three or four times a day, is binding in infantile diarrhœa.

Common White Hoarhound.—The herb may be used in infusion (an ounce to a pint of water), taken hot and frequently in recent colds to produce sweating. The cold tea, drunk freely, is serviceable in chronic lung affections. Cough-drops are used for sore throat and cough.

Colt's Foot.—The infusion of the dry leaves is used to soften the phlegm in chronic catarrh. It may be drunk freely.

Common Juniper.

Currants.

Common White Hoarhound.

Colt's Foot.

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PLATE VIII.

MEDICINAL PLANTS

PLATE IX.

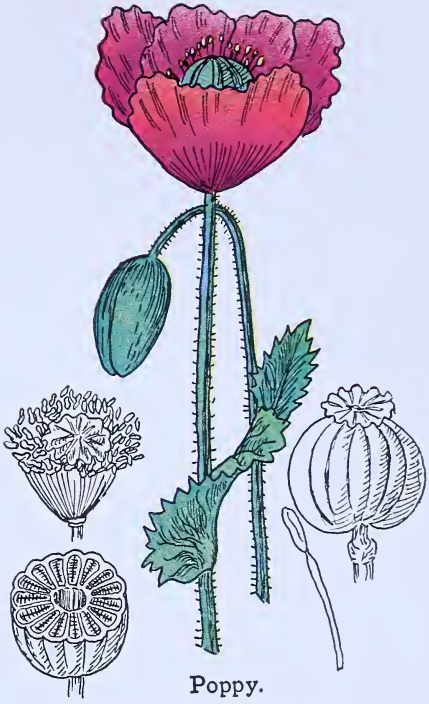
Plantain.—The fresh leaves are pounded in a mortar into a paste and applied to wounds to check bleeding. In sumach poisoning, burns, scalds, bruises, and even erysipelas, it is said to be extremely useful.

Poppy.—By cutting the unripe seed pod a milky fluid is obtained called opium. Powdered opium may be mixed into a paste with water and applied to a beginning boil with relief. Opium is used in medicine in many forms, as laudanum, morphine, paregoric, and so forth. It is given in various forms and quantities to relieve pain and irritation, to relax spasms, to produce sleep, to check secretions, and to influence nutrition. It should be used with great caution.

Pennyroyal.—Pennyroyal tea, or a recent infusion of the leaves and tops, is used in flatulent colic and recent suppression of the menses. The infusion may be drunk in teacupful doses, several times a day. The fresh herb is said to be obnoxious to mosquitoes, and may be hung about the sleeping room, or the hands and face bathed with a recent infusion or a solution of the oil in alcohol (one to ten) in order to keep off these midnight marauders.

Hellebore.—This has been used by some to bring on the menstrual flow by purging, but is now very rarely employed. It causes vomiting and acts on the heart. It also destroys sensation when used locally. This medicine should be carefully used, as it is very poisonous. The dose is four to fifteen grains. A dose of the fluid extract of black hellebore, three to five drops three times a day, is used in dropsy, especially dropsy of the brain.

Plantain.



Poppy.

Pennyroyal.

Hellebore.

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PLATE IX.

MEDICINAL PLANTS

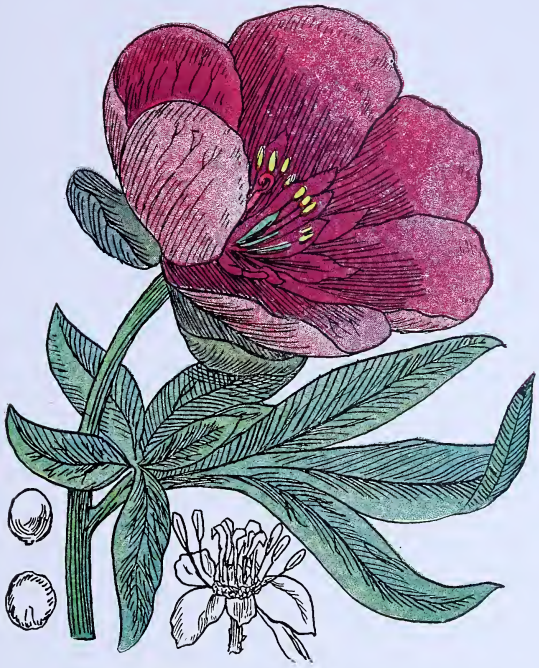
PLATE X.

Peony.—An infusion is made by boiling one ounce of the powdered root in a pint of water. It is good in spasms, whooping-cough and nervous diseases. Dose, half a cup four times a day. Formerly it was considered as a tonic for the nerves and was given for epilepsy and St. Vitus' dance.

Perforated St. John's Wort.—This plant is used as a tea to promote menstruation. It may be taken in wineglass doses, three to four times a day.

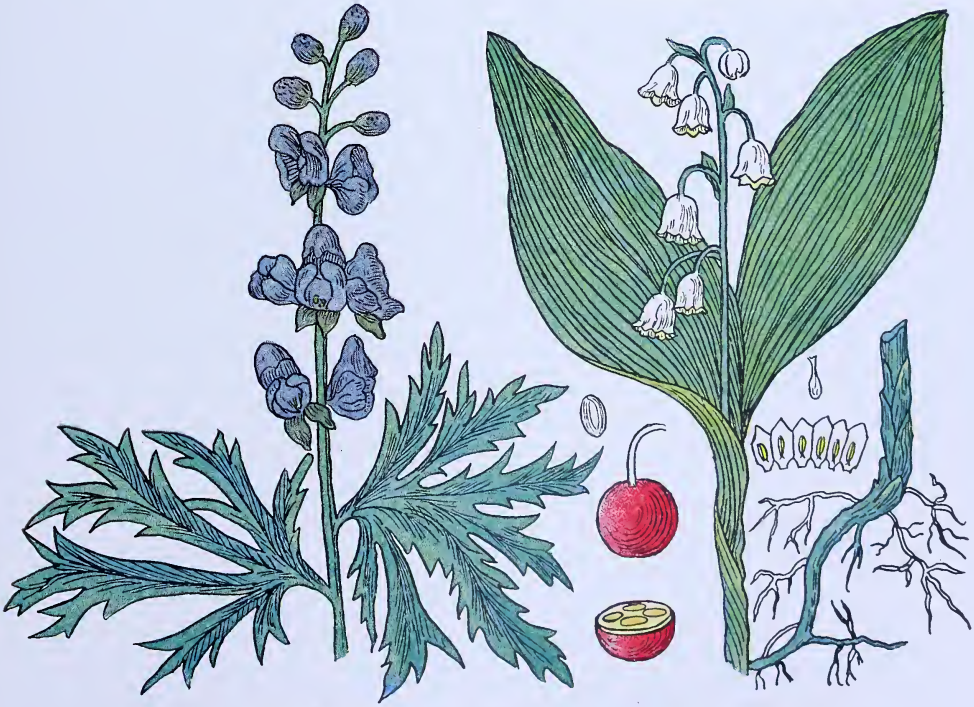
Wolf's Bane.—This drug, which is beter known under the name of aconite, is very powerful and dangerous. It is given in the first periods of fevers and inflammations, such as pneumonia, erysipelas and rheumatism. A few drops of the tincture are mixed in a tumbler of water and a teaspoonful of this is given every ten, fifteen or twenty minutes. Asthma, especially in children, and preceded by cold in the head, is generally benefited by it. In the form of a liniment it is used in neuralgia. Extreme care must be taken in using wolf's bane.

Lily of the Valley.—In small doses this drug strengthens the heart; in larger quantities it quiets it. It quickly relieves the shortness of breath and palpitation in heart disease, and after having been given for two or three days may be stopped for a week or more without the symptoms returning. It increases the flow of urine and reduces dropsy. An infusion or tea is made by taking one part of the underground stem and rootlets to three parts of water. The dose of the infusion is a tablespoonful to a wineglassful two or three times a day.



Peony.

Perforated St. John's Wort.



Wolf's Bane.

Lily of the Valley.

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PLATE X.

MEDICINAL PLANTS

PLATE XI.

Flax.—Ground flaxseed mixed with boiling water forms flaxseed poultice, which is spread at least half an inch in thickness upon muslin or flannel, and applied as hot as possible in order to relieve pain and congestion in peritonitis and in pneumonia, pleurisy, and so forth, as jacket poultices, renewed every two or three hours. Flaxseed poultices are also applied to boils and abscesses to abort them or to hasten their ripening.

A hot infusion (a tablespoonful to a pint of water) flavored with licorice root or lemon peel is used in colds of the chest, to cause sweating and to loosen the cough. Flaxseed tea, drunk freely, is used as a soothing drink in inflammation of the stomach. Whole flaxseed, in tablespoonful doses, once or twice a day, has been ordered as a laxative in habitual constipation.

The oil of flaxseed, or linseed oil, is an old application to burns.

Wormwood.—An infusion is made with one or two teaspoonfuls of the plant to a pint of water, and in wineglassful doses is used as a tonic or for worms in children. It is a domestic remedy for flatulent dyspepsia and weak digestion. Dose, from one to four tablespoonfuls twice a day. Externally it has been used as a stimulating application to indolent ulcers. A tincture, flavored with aromatics, forms an intoxicating drink called absinthe, used to a large extent in France.

Carrot.—The seeds are ground into powder and used to relieve colic and to increase the flow of urine. The dose is half a teaspoonful to a teaspoonful, twice daily. The root is said to be excellent for poultices. Carrot, used as a substitute for chewing tobacco, has been said to cure kidney complaint.

Horse Chestnut.—The bark is used, the best preparation being a fluid extract with dilute alcohol, although a decoction or tea is also employed. The dose of the fluid extract is twenty drops to a teaspoonful, three times a day. It is said to be a good substitute for quinine in malarial fevers and is also used in neuralgia. A dose of the tincture, three to five drops, three times a day, is a remedy for itching or burning piles.

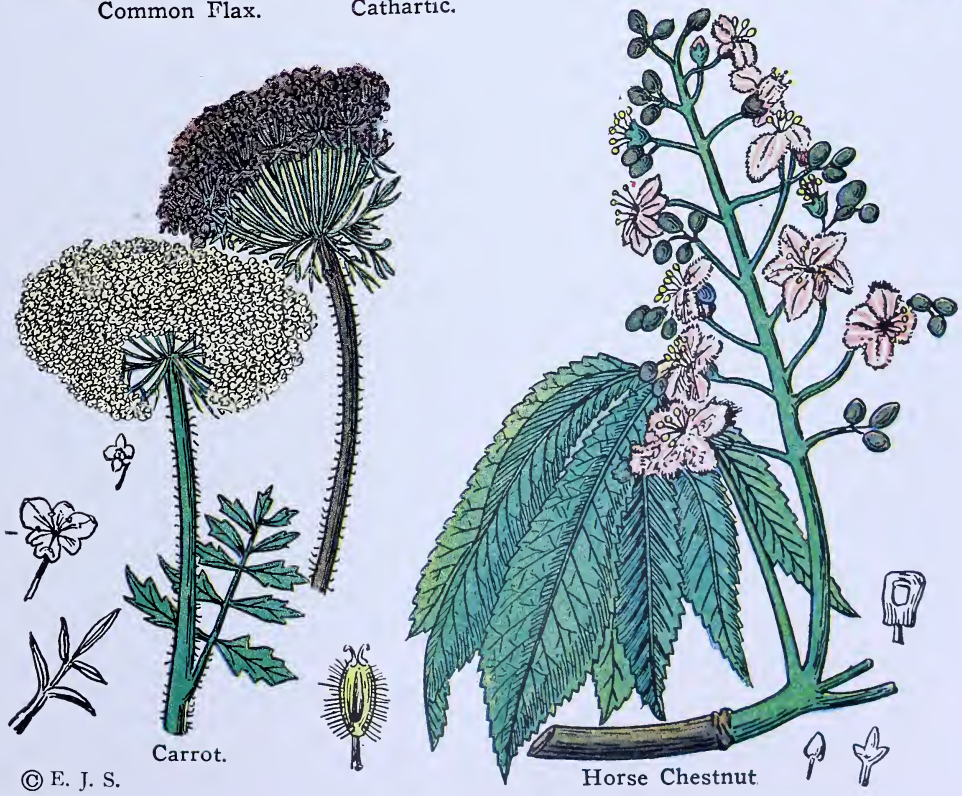

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PLATE XI.

MEDICINAL PLANTS

PLATE XII.

Licorice.—Licorice root is soothing to the throat, loosens cough and is laxative. Licorice is given for cough as Brown mixture and Wistar's cough lozenges. One to two teaspoonfuls of compound licorice powder is given daily in constipation, especially during pregnancy.

Iris (Straw Lily).—The powdered root, when fresh, produces vomiting and is a powerful cathartic; less so after drying. In chronic liver trouble, especially of malarial origin, the preparations of iris are very useful. In dropsy they are also of service in stimulating both the kidneys and bowels. They are also given for worms. The dose of the extract is a quarter of a grain to a grain, and of the fluid extract, half a teaspoonful to a teaspoonful, two to three times a day.

Dandelion.—The root should be gathered in the autumn. An infusion is made by taking two ounces of the fresh leaves or roots to a pint of water, the dose being two to four tablespoonfuls, two to three times a day. The preparations are bitter and probably stimulate digestion and act as a tonic. Dandelion is a laxative and increases the flow of urine. It is also prescribed for jaundice and for a sluggish liver. If the extract be used, the dose is from five to twenty grains three times a day.

Blackberry—Common Bramble.—The bark of the root is used. It is binding and tonic. It is used in diarrhœa, especially after cleansing the bowels with castor oil. The best preparation of the blackberry root is the fluid extract, given in doses of half a teaspoonful three or four times daily. The syrup and the spiced syrup, in the dose of a teaspoonful to a tablespoonful, are also used. Very popular preparations are blackberry cordial and blackberry brandy, of which a teaspoonful to a tablespoonful is taken three or four times a day. Blackberry tea is valuable as an enema in leucorrhea, gleet and falling of the womb.

Licorice.

Iris (Straw Lily).

Dandelion

Blackberry.

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PLATE XII.

MEDICINAL PLANTS

PLATE XIII.

Great Mullein.—This plant grows by the roadside and in neglected fields. It is given for catarrh, coughs, dysentery and piles in the form of an infusion made with milk, four ounces of the fresh, or a corresponding quantity of the dry leaves, being boiled for ten minutes in a pint of fresh milk. This quantity is to be drunk thrice daily, while still warm. It has long enjoyed a popular repute in Ireland as a remedy in diseases of the lungs. It has likewise been used in diarrhœa and inflammation of the bladder.

The flowers are said to remove warts. They are applied, while fresh, by pressing and rubbing upon the growth.

Rosemary.—From one and one-half to three teaspoonfuls of the plant, dried and powdered, taken as an infusion (tea), are said to produce decided sweating. The oil of rosemary is used in hair lotions and in an ointment used in neuralgia, chronic rheumatism and lumbago.

Nettle.—The juice of the nettle, in teaspoonful doses every hour, is of great value in cases of hemorrhage of the nose, lungs, intestines and urinary organs. The decoction may be made either with the seeds or with the leaves, and, drunk freely, is excellent for diarrhœa and dysentery.

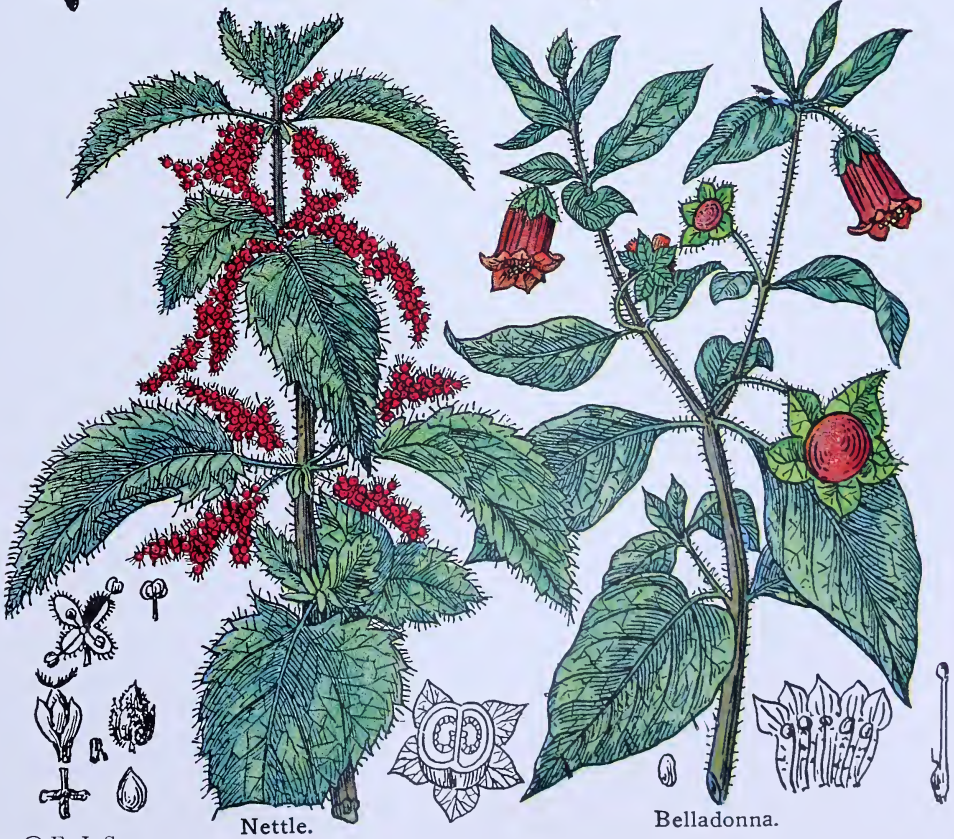
Belladonna.—The fleshy, creeping root is especially useful, but must be taken from plants at least three years old. The leaves of belladonna or deadly night-shade are also used, the smaller leaves gathered when the plant is in flower being best.

Locally, belladonna is used as an ointment or liniment in neuralgia, chronic rheumatism; also to check sweating and relieve local pain. Internally, it is used chiefly to relieve pain, relax spasm and check oversecretion or bad discharge.

Its power of widening the pupil is used in treating the eye. In giving this dangerous drug the eye should be carefully watched. The dose of the tincture is five to twenty drops, once or twice a day, in cases of neuralgia, spasms and other nervous affections. Great caution is required, as the medicine is a poison.

Great Mullein.

Rosemary.



Nettle.

Belladonna.

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PLATE XIII.

MEDICINAL PLANTS

PLATE XIV.

Parsley.—A hot infusion is made by taking an ounce of the fresh root to a pint of water. One to four teaspoonfuls, given three times daily, in cases of scanty menstruation will relieve pain. It is used to increase the secretion of urine in dropsy and gonorrhea, in the form of a decoction, drunk freely.

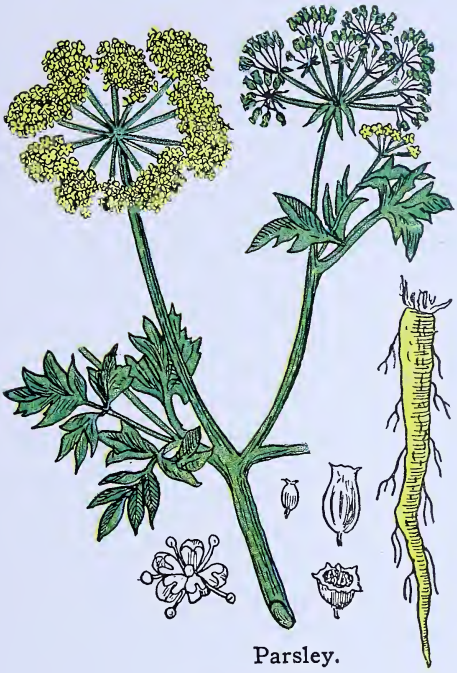
Valerian.—The underground stem and roots are used. It is given in the nervous disorders of women, especially nervous headache and hysteria. The various nervous disorders which occur at the changes are relieved by it. In convulsion or St. Vitus' dance in children, due to worms, and in whooping-cough it has been used with success. One to two teaspoonfuls of the tincture is given, three times daily.

Digitalis or Foxglove.—The leaves are gathered from plants of the second year's growth and must be carefully selected. An infusion is made by taking one and one-half parts to one hundred parts of water.

Locally, digitalis is used in joint inflammation. A poultice containing a teaspoonful or two of the leaves is placed over the kidneys in cases of difficult or impossible urination.

Its chief internal use is in heart disease, although it is often given for bleeding. The dose of the infusion is a teaspoonful to a tablespoonful, three or four times a day.

Crow-Foot.—The buttercup plant is sometimes used externally in cases of rheumatism. As it belongs to a very poisonous species, it should be used carefully and only on the prescription of a physician.



Parsley.

Valerian.

Digitalis or Foxglove.

Crow-Foot.

© E. J. S.

PLATE XIV.

MEDICINAL PLANTS

PLATE XV.

Hemlock.—The full-grown fruit is gathered while yet green. Conium juice is expressed from the fresh leaves, and has half its quantity of alcohol added to it to preserve it. This is given in doses of half a teaspoonful to two teaspoonfuls. The seeds are used in making most preparations. Internally it is sometimes used in nervous affections, but it is a dangerous poison and should be used cautiously.

Poultices of the leaves of hemlock and flaxseed (two parts of the former to six of the latter) with boiling water, have been used as a soothing dressing to painful swellings. A hemlock ointment is made by bruising the leaves with sufficient water and extracting and mixing the juice with lard, and is an excellent local remedy in painful maladies.

Barberries.—The bark of the root has been made into an infusion, but the fluid extract in ten to thirty drop doses is most used. In this form the drug is tonic and stimulates the kidneys. It is valuable in the treatment of blood diseases, dyspepsia, liver trouble, habitual constipation and skin diseases. The tea of the bark may be taken in doses of three to four teaspoonfuls, three times a day.

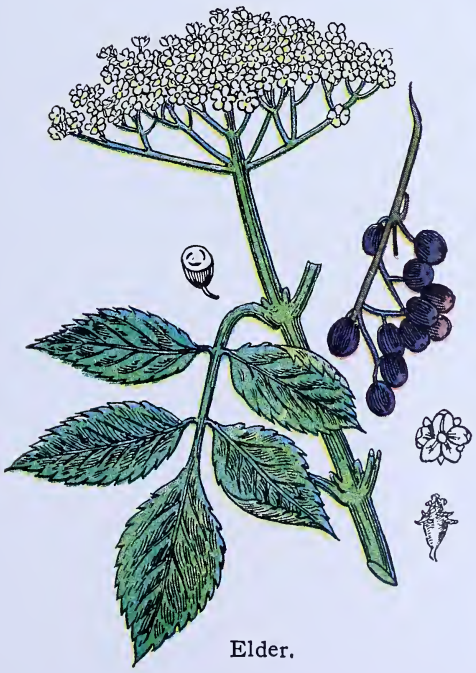
Elder.—One to two teaspoonfuls of an infusion of the flower, drank while hot, increases the flow of urine and causes sweating. It may cause vomiting, if given in too large a quantity. The flowers are edible, and are used in scurvy, rheumatism and syphilis. Elderberry jam is laxative.

A decoction is made of the inner bark, which acts on the kidneys and intestines. One or two teaspoonfuls, two to three times a day, is the dose.

Oak-Tree.—A decoction is made of one ounce of the bark to a pint of water and given in doses of half a teaspoonful to a teaspoonful three times daily, for dysentery and diarrhœa. It is occasionally used as an injection or wash in leucorrhea; also as a gargle in sore throat and catarrh. The powdered bark is used on ulcers. The oak yields tannic acid, in which form it is used as an astringent enema in gonorrhea, gleet and leucorrhea.

Hemlock.

Barberry.



Elder.

Oak-Tree.

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MEDICINAL PLANTS

PLATE XVI.

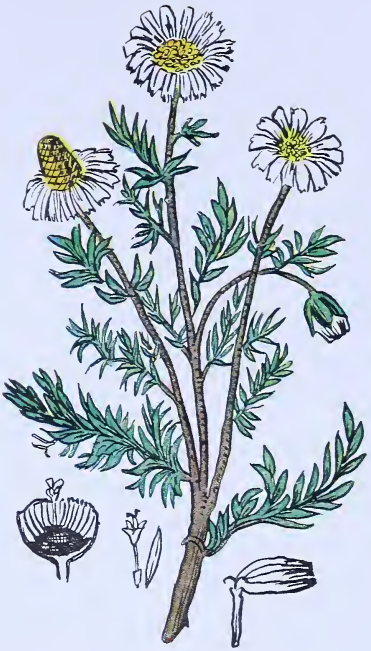
Bitter-Sweet Nightshade.—A decoction is made by boiling an ounce of the young branches in a pint of water and given in doses of a teaspoonful to a wineglassful two or three times daily, for jaundice, rheumatism and syphilitic affections. It is believed to be of use in long-standing scaly eruptions. The fresh decoction, drunk freely, is used to produce sweating in rheumatism or acute bronchitis and colds. It is also beneficial in the diarrhœas of children when caused by exposure to cold or damp. The dosage should be small and cautiously given.

Common Chamomile.—The infusion is made with a tablespoonful of the flower heads to a pint of water and is taken freely. In large doses the hot infusion causes vomiting, but in one or two ounce doses it relieves gas in the stomach, favors perspiration and the action of the kidneys. Locally, it may be used as a poultice. It is used principally in domestic practice in the treatment of colds, bronchitis and dyspepsia, and is taken in the form of an infusion in doses of from two to three tablespoonfuls, two or three times daily.

Caraway Seed.—An oil is made from the fruit and used in doses of one to five drops, two or three times a day, for distention of the abdomen due to gas. It is combined with other medicines to lend a pleasant flavor and to prevent griping.

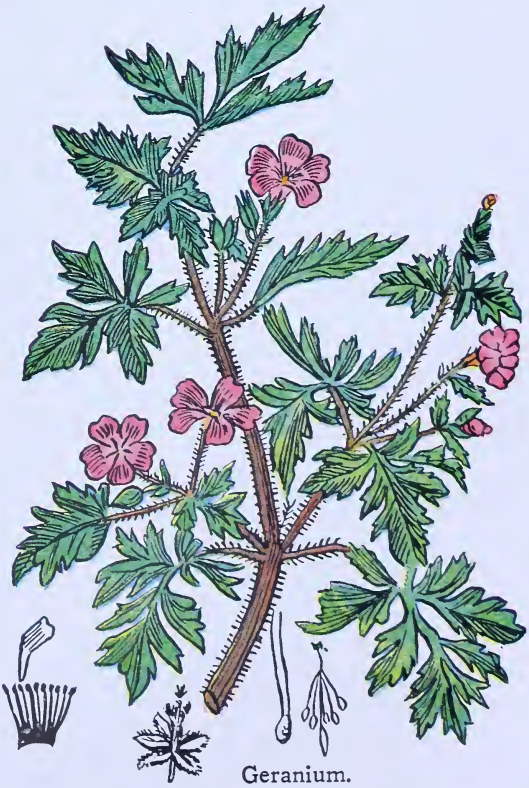
Geranium.—A decoction can be made from the underground stem. It improves the appetite and digestion and promotes nutrition. It is used to stop bleeding. As an injection it is serviceable in gonorrhea, gleet and leucorrhea. In diarrhœa in children the decoction may be given in milk, which covers its taste. Dose, one-fourth to one-half teaspoonful, five or six times a day.

Bitter-Sweet Nightshade.



Common Chamomile.

Caraway Seed.



Geranium.

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MEDICINAL PLANTS

PLATE XVII.

Common Dill.—The fruit of this plant is warming, stimulating and quiets nervousness. A tea of the plant, in teaspoonful doses, is used in children's colic to relieve the hiccoughs. Occasional use of the decoction by mothers is thought to promote the secretion of milk.

Peppermint.—Peppermint water is given in doses of teaspoonful to a wineglassful; oil of peppermint, one to five drops, and spirits of peppermint, ten drops to a teaspoonful. In neuralgia oil of peppermint may be painted over the painful spot. It may also be used for rheumatism and chronic gout. In the colic of children the spirits of peppermint in hot water is a good household remedy. A warm infusion of mint, taken frequently in teaspoonful doses, is useful for the pains caused by gases in the intestines. A cloth, saturated in a teacup of water to which a teaspoonful of essence of peppermint has been added, applied to head and temples, gives relief from headache.

Mezereon (Laurel).—An ointment is made from the fluid extract of the bark (twenty-five parts), lard (eighty parts) and yellow wax (twelve parts). This ointment is used as an irritant to keep up discharges from ulcers and blistered surfaces. Mezereon bark has been successfully used to relieve toothache.

Common Black Briony.—The root is dried, and half an ounce of it with a pint of boiling water made into an infusion, which is given in doses of a wineglassful three or four times a day. It may be given for dropsy and inflammation of the joints. It is an active purgative, causing large, watery stools.

Common Dill.

Peppermint.

Mezereon (Laurel).

Common Black Briony.

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PLATE XVII.

MEDICINAL PLANTS

PLATE XVIII.

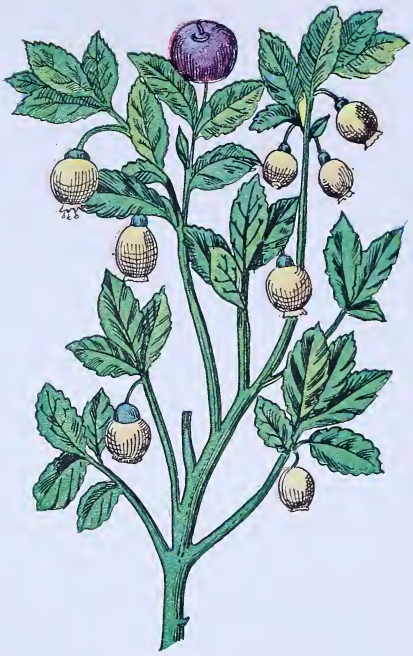
Common Hedgewort.—Liquid extract of the root is used inwardly for catarrh of the stomach, liver, pancreatic and kidney complaints, hypochondriasis and hysteria. Physiological effect is solvent, acid-removing (alkaline) and blood cleansing. Chemical constituents: Bitter extract, resin, sugar, alkaline salts, potash, silicic acid. Taste, very bitter.

Bilberry.—Infusion of the leaves is given internally for dropsy and pleuritic effusions, catarrh, cough, and weakness of the bladder. Physiological effect: slightly astringent. Chemical constituents: Tannic acid, quinic acid, and gum. Taste, herbaceous.

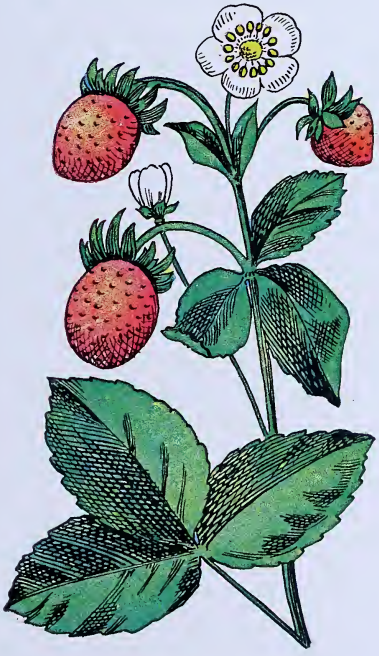
Wild Strawberry.—An infusion of the leaves is given internally for diarrhœa, gout, jaundice, etc. The physiological action is astringent and blood cleansing. The chemical constituents are a considerable quantity of soda salts and silicic acid. The taste is slightly herbaceous.

Periwinkle.—The liquid extract of the herb is used internally for diarrhœa, mucous discharge from the air passages or intestines, hemorrhage; externally, as a gargle and mouth wash for spongy gums. Physiological action: Strengthening, blood cleansing and aperient. Chemical constituents. A very bitter extract and tannin. Taste is bitter and astringent.

Common Hedgewort.



Bilberry.



Wild Strawberry.

Periwinkle.

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PLATE XVIII.

(Continued from page 1392.)

several times a day of a tea made by boiling celery stalks till they are soft. At the same time celery, cooked or raw, should be used regularly as a table food.

CHAMOMILE (Anthemis).

Definition.—The flower heads of anthemis nobilis are collected from the cultivated plant. The oil is the active principle.

Use.—The activity of the plant depends upon the presence of the oil. The action of the oil is to act as a sedative to the nervous system; hence its use in checking reflex cough. It also favors free perspiration and free kidney action.

Manner of Using.—Make a drink as follows: Pour a pint of boiling water over an ounce each of chamomile flowers and the leaves and flowering tops of boneset; one-half of this amount is a dose. If the whole amount be taken, emesis or vomiting will be produced, and this will at times be the action desired.

CHITTIM BARK (Rhamnus Prushiana).

This is known medicinally as cascara sagrada. It is much used by modern physicians for the cure of constipation, and is an excellent home remedy. It is prepared for use by steeping a half-ounce of the bruised bark for half an hour in a half pint of warm water. When cool, take a teaspoonful three times a day. If the fluid extract of the bark is used the dose would be from ten to fifteen drops, three times a day. Sometimes it acts as a physic. In such cases the size of the dose should be diminished.

CHLORAL (Chloral).

Definition.—Chloral is a colorless liquid formed by the action of chlorine on alcohol. With water chloral forms a crystallizable compound. Chloral should be kept in well-stoppered bottles as the crystals volatilize slowly.

Use.—Taken internally chloral has a sedative influence on the brain and spinal cord. In cases of restlessness and delirium it produces a quieting influence on the brain and induces sleep. In spasm and convulsion it alleviates this condition. It influences the heart adversely, and in cases of a weak or diseased heart its use is attended with danger.

Manner of Using.—It is best given well diluted in some agreeable syrup. It should not be taken without the advice of a physician.

CHLOROFORM (Chloroformum).

Chloroform is a heavy liquid made by the action of chlorine on alcohol. It is used in the same class of cases as ether, but is preferred to ether in children and old persons on account of the irritation of the bronchial tubes produced by ether in the very young or very old.

CITRIC ACID (Acidum Citricum).

Definition.—Citric acid occurs in the form of colorless crystals. It is obtained from lemon or lime juice and has a sour taste.

Property.—It acts favorably upon the liver in cases of inactivity. By stimulating the glandular secretion of the intestinal tract it improves digestion and nutrition.

Use.—The use of citric acid in the treatment of scurvy is well known and cannot be superseded by any remedy at present under our command, except fresh lemon juice itself. In fevers a drink made of citric acid is very soothing.

Manner of Using.—The best form for administration is the syrup of citric acid, which may be given in doses from a teaspoonful to a tablespoonful.

COCA (Erythroxylon).

Definition.—Coca leaves are taken from a small tree in Peru and Bolivia. The principal constituent of the leaves is cocaine.

Use.—The value of coca lies in cocaine. Cocaine is widely used locally for the relief of pain. It may be applied for the performance of an operation when for any other reason it is not desirable to give a general anesthetic like ether or chloroform.

COCHINEAL (Coccus).

Cochineal is derived from the crushed and dried bodies of the females of coccus cacti. It yields a very brilliant red coloring matter from which carmine is obtained. Cochineal has but little value in medicine in comparison with its use in the arts as a coloring agent.

COD-LIVER OIL (Morrhuæ Oleum).

Definition.—Cod-liver oil is a thin, yellow, oily liquid, having a fishy odor and taste. It is obtained from the fresh livers of the cod.

Use.—Cod-liver oil is an easily digestible food. In most cases of poor nutrition it is of value.

Manner of Using.—Cod-liver oil should not be taken directly after a meal. It should be taken about three hours after a meal, when gastric digestion is about complete, from the fact that oil is digested not in the stomach, but in the intestine.

COFFEE (Coffea).

Definition.—Coffee is the seed or berry of the coffee Arabica. It is one of the sources of caffeine.

Use.—Coffee is a stimulant to the nervous system. It increases the capacity for intellectual effort. When taken to excess it is frequently the cause of headaches.

COLT'S-FOOT (Tussilago Farfara).

Parts used—root and leaves.

Its demulcent properties prove its efficacy in chronic coughs, consumption and other affections of the lungs. It is used in the form of a decoction made with an ounce of the plant to a pint of boiling water, of which a teacupful may be given several times a day.

Description.—A perennial herb with a creeping root. The flower, which stands singly, is large and yellow in color. The leaves do not appear until after the flowers have blown. The flowers have an agreeable odor.

COMMON RUSH (Juncus Effusus).

A common plant, growing in water, or in wet soil, with pithy or hollow, rarely branching stems. A decoction of the root—one ounce of root to a pint of water—taken freely three times daily, is good for the kidneys, dropsy, gravel and incontinence of urine. Ashes of the rush, in doses of five to ten grains twice a day, relieves dyspepsia and sour stomach. A tincture of the rush, made by adding a handful of the plant to a pint of alcohol, and taken freely three times a day, is also good for incontinence of urine. The pith may be used as a demulcent drink in fevers.

COPAIBA (Copaiba).

Use.—This balsam comes from a tree in South America. Its principal use is relieving the irritation in inflammations of the urinary channels, especially in gonorrhea.

CRANESBILL (Geranium).

(*See Plate XVI.*)

CRANBERRY.

A cranberry poultice is an excellent application to the affected parts in cases of piles. They also serve as a cure when cooked for table use, and partaken of freely at each meal. Pounded cranberries, applied as a poultice, are excellent for removing the pain and inflammation of erysipelas. In doses of a tablespoonful daily cranberry extract is said to afford relief in hysteria.

CREOSOTE (Creosotum).

Definition.—Creosote is obtained from the distillation of wood tar. The best preparation is made from beechwood and is known as beechwood creosote. Creosote is a yellow, oily liquid having a smoky odor.

Use.—Creosote is an antiseptic and local anesthetic. Internally also it is an antiseptic and is used in diarrhœa and dysentery. In consumption its use is often followed by a diminution of all the symptoms and general improvement.

Manner of Using.—It may be given internally in milk, cod-liver oil or wine. It may also be given in capsules.

DANDELION WINE.

A spring drink for cleansing the blood. In a jar containing two quarts of blossoms pour three quarts of hot water. Let stand forty-eight hours, strain and add two teaspoonfuls of dry yeast and a teacupful of white sugar. Flavor with lemon or wintergreen. A wineglassful three or four times a day.

DEADLY NIGHTSHADE (Belladonna).

(*See Plate XIII.*)

ERGOT OF RYE (Ergota).

Definition.—Ergot is the compact spawn of a parasitic fungus investing the rye.

Use.—The chief action of ergot is upon the parturient uterus, which it contracts. It assists nature. Also used to control hemorrhage.

Manner of Using.—The fluid extract is the preparation most often employed.

ETHER (Æther).

Definition.—Ether is a clear, colorless liquid having its own peculiar odor and a sweetish taste. It is very inflammable, and its vapor mixed with air and ignited explodes.

Use.—When ether is poured upon the skin it produces a sensation of cold from its rapid evaporation. The part may be frozen, and at this time a small operation, such as the opening of an abscess, may be performed. Taken internally ether is a stimulant to the heart. Its well-known effects in surgery, producing the state known as anæsthesia, depend upon the action of the drug upon the brain and spinal cord. It was first used in surgery by Dr. Warren in 1846 at the Massachusetts General Hospital.

Manner of Using.—To produce loss of consciousness the vapor is inhaled, administered with safety only by a physician. For local use the vapor is locally applied.

EUCALYPTUS OIL.

Eucalyptus is a genus of trees indigenous to Australia and Tasmania but now grown in United States and many other parts of the world. The medicinal part is the oil distilled from the leaves. Taken internally it produces a sense of warmth in the stomach and excites the flow of saliva. It is sometimes given for malaria, chronic bronchitis, asthma, gonorrhœa, etc. Dose 10 to 20 minims. It is sometimes used locally in ulcers and chronic skin affections.

FLAXSEED (Linum-Linseed).

(*See Plate XI.*)

FOXGLOVE (Digitalis).

(*See Plate XIV.*)

GALLIC ACID (Acidum Gallicum).

Definition.—Gallic acid may be obtained from tannic acid, which is found in the galls upon the oak tree. These galls or nodes are lumps caused by insects. Gallic acid is in the form of long needles.

Property.—Gallic acid, like tannic acid, is astringent, but not so powerful as tannic acid.

Manner of Using.—When prompt action is desired it should be used in powder. It is given also in other forms, such as pills, and so forth.

GARDEN ARTICHOKE (Cynara Scolymus).

A perennial plant, cultivated in our gardens. A tincture prepared from the leaves is most efficacious in rheumatic, gouty and neuralgic affections. Dose: A teaspoonful three times a day.

GARLIC (Allium).

(*See Plate VII.*)

Definition.—Garlic is the dried bulb of the allium sativum, a native of Asia and Egypt, but now naturalized in Europe and America. It resembles the onion and leek.

Use.—When added to a cough mixture garlic aids in the expectoration of secretion. For this latter purpose it is especially valuable in the case of children. Taken internally it is also a remedy against scurvy, hence called an antiscorbutic. Applied locally in the form of a poultice to the abdomen it relieves infantile intestinal colic.

Manner of Using.—The odor is quite offensive, and some will prefer other measures on this account. The preparation for internal use is known as the syrup of garlic, which may be used in a dose from ten drops to a teaspoonful.

GINGER (Zingiber).

Ginger comes from various sources, but Jamaica ginger is preferred for culinary purposes, as it has the best flavor. Ginger increases the secretions of the intestinal tract, and acts as a carminative. It is used in various preparations to disguise the unpleasant taste.

GLYCERINE (Glycerinum).

Definition.—Glycerine is a transparent substance obtained by the decomposition of fats or fixed oils. It is a constituent of the waste in the process of the making of soap. It is now prepared in large quantities for commercial purposes.

Use.—Taken internally glycerine is in part absorbed or oxidized and so acts partly as a food. If a large amount, as a tablespoonful or two be taken, it acts as a laxative. Externally applied it acts as an emollient. In the care and treatment of bed sores it is highly useful. The parts should be bathed twice daily with warm water and gently rubbed with glycerine.

GRAPEVINE (Vitis Vinifera).

The vine is too well known to require description. Most useful in dropsy and chronic dysentery. The dried fruit is the part employed, of which an infusion is made, placing about two ounces of the fruit in a pint of boiling water, straining and cooling. Dose: A tablespoonful, in either case, every two or three hours, according to the urgency of the symptoms.

HEMLOCK (Conium).

(*See Plate XV.*)

HONEY (Mel).

Definition.—Honey is a saccharine secretion deposited in the honeycomb by the honey-bee, the apis mellifica. The best honey is known as virgin honey. It is obtained by incising recent combs and straining. Clarified honey is made by heating honey, removing the frothy scum and straining. Other products made by the aid of heat are of a darker color and are less pure.

Use.—Honey is to some slight extent a laxative. It is a pleasant, sweet article of food.

HOPS (Humulus).

(*See Plate VI.*)

HOUNDS' TONGUE (Cynoglossum Officinale).

A biennial plant, named from the shape of its leaves. The root is the part employed. It has been found most useful as a sedative in coughs,

catarrh, spitting of blood and dysentery. An infusion is made with one ounce of the root to a pint of water. Dose: A tablespoonful four times a day.

INDIAN HEMP (Cannabis Indica).

Definition.—Indian hemp is obtained from the flowering tops of the female plant of the canabis sativa grown in the East Indies. There is a confection known as haschish or gunjah.

Use.—This drug is much used in Eastern countries and is a frequent cause of insanity in these countries. It is taken for the pleasant mental effect produced, though this is but temporary. The first stage is accompanied by exhilaration during which the imagination is actively engaged. The imagination brings up images of its own creation. After a time the pleasant effects are followed by unpleasant and disagreeable effects. Ideas of time and space are perverted. Frequent indulgence in the drug brings about permanent mental change. An impulse to kill has been known to follow the abuse of the drug. For medicinal purposes cannabis is used to quiet spasms and produce mental quietude. In accordance with this use it is employed in treating coughs and the restlessness and delirium of certain diseases. It has been used with benefit in neuralgia.

Manner of Using.—The tincture is the preparation usually employed, though it should never be taken without a physician.

IPECAC (Ipecacuanha).

Definition.—Ipecac is the dried root of a plant which is native in Brazil.

Use.—Ipecac is used as an emetic and expectorant. It enters as an ingredient in cough preparations to soften the expectoration of phlegm. It has been used in heavy doses for dysentery.

KEROSENE OIL.

Appendicitis.—Since the theory that this disease is curable by absorption has gained prominence, the use of kerosene oil in connection with the cure has been found useful.

Bunions and Corns.—A continuous application to corns and bunions for a few days will reduce inflammation and pain, and an entire removal of the corn may be brought about.

Burns.—Cloths saturated with kerosene, and applied to burns, exclude the air and bring desired relief from pain.

Cleansing the Scalp.—A little kerosene introduced into glycerine constitutes an ointment that will speedily remove dandruff and contribute to a clean and healthy scalp.

Colds.—Ten to twelve drops of kerosene oil on cut loaf sugar, taken every two or three hours, has been found effective in curing colds, also rub neck and chest.

Consumption.—A cloth saturated with kerosene oil, bound around the chest at night and frequently repeated, will remove lung soreness, and it may be taken inwardly with advantage. Eight to ten drops three or four times a day in sarsaparilla. It has been tried as a cure for consumption.

Croup.—Kerosene has been used in croup with success. It may be taken internally and applied externally.

Diphtheria.—Swabbing of the throat, at intervals of two to three hours, with kerosene, has been found effective in destroying the membrane of diphtheria and reducing inflammation.

Quinsy.—External and internal use of kerosene has a remedial effect in this obstinate disease.

Rheumatism.—Petroleum was a favorite Indian remedy for rheumatism. In the purer form of kerosene it is still regarded as a favorite remedy for this painful disease. It may be applied by frequent rubbing.

Toothache.—Cotton saturated with kerosene and placed in the tooth often affords immediate relief.

Vegetable Poisons.—Kerosene is an excellent lotion for the external inflammation resulting from vegetable poisons. It should be applied frequently until relief is had.

LACTIC ACID (Acidum Lacticum).

Definition.—Lactic acid is a colorless syrupy liquid having an acid taste. It is obtained from sour milk.

Use.—As this acid is found in the stomach during the first part of digestion, changes in the amount present cause forms of dyspepsia. When in excess or when it is absent dyspepsia in one form results. Its use in cases of deficiency added to that of pepsin, is followed by beneficial results. Locally it is a mild caustic, and is applied to warts and ulcers, by rubbing it on, with the intent of destroying them.

LADIES' SLIPPER (Cypripedium Parviflorum).

Grows in different portions of our own country, and is marked for its beautiful flowers. The root is the part used. Has been used with

marked success in epilepsy and in various other nervous diseases. A decoction is made with two ounces of the root in two pints of water, boiled to one and a half pints. Dose: A tablespoonful four times a day.

LARD (Adeps).

Definition.—Lard is prepared from the fat of the abdomen of the hog. It is washed with water, melted and strained.

Use.—Care must be taken that the lard used does not become rancid. By the addition of benzoin the lard is prevented from undergoing this change. As an application for burns lard may be used as follows: Wash the lard, beat up with an equal quantity of lime water, and add a few drops of oil of bitter almond or carbolic acid. Lard softens and removes scabs.

Manner of Using.—For medicinal purposes the form of lard used is known as benzoinated lard.

THE LEMON IN MEDICINE.

As an Anti-Narcotic.—In poisoning by narcotic substances, as opium, lemon-juice may be administered after the poison has been vomited or removed from the stomach, to counteract the effects.

Asthma.—The administration of tablespoonful doses of lemon-juice in a glassful of any of the mineral waters, three times a day, has been productive of manifestly good results.

As an Antidote in Alkaline Poisoning.—In cases of poisoning by the alkalies the vegetable acids are their antidotes, and the most convenient, easily procurable acidulous substances are, in general, vinegar or lemon-juice.

Biliousness.—The use of lemon-juice, in doses of one or two ounces diluted with hot or cold water, three or four times a day is an invaluable remedy. It is supposed to act as an eliminator of bile.

Corns.—A slice of lemon held in place by bandage over offending hard corn, or placed between the toes for soft corns for several successive days, is an old, well-tried, standard remedy.

Coughs and Colds, Hoarseness.—The following will be found soothing and healing in most ordinary coughs and colds:

Whole flaxseed ..... 2 ounces
Water (boiling) ..... 1 pint
Juice of two lemons.
Sugar.

Pour the boiling water on the flaxseed in a suitable vessel, let it steep three hours, pour off the clear liquid, add the lemon-juice and sweeten to taste. Ice it for drinking. Dose, one ounce.

Diphtheritic Sore Throat and Gangrenous Sore Mouth.—Lemon-juice has been used with striking advantage as a local application (gargle and mouth wash) in these diseased conditions; also in other varieties of gangrene from constitutional causes.

Dropsy.—Mild and sustained diaphoreses is entitled to special favor. The skin must be brought into a state of moderate excitement by external warmth—by hot baths twice a day—at same time administering hot lemonade, after which put patient to bed. Free perspiration will follow, and an improvement in the quantity and quality of the urine, and a material subsidence of the dropsy or edema will ensue.

Erysipelas.—In this affection rest, saline laxatives, low diet and cooling drinks are the elements of treatment in mild and simple cases. A very refreshing and agreeable way of prescribing a cooling drink and at the same time obtaining valuable diaphoretic and diuretic effects is by administering the following:

Take one drachm (60 grains) of bicarbonate of potassium and water four fluid ounces. Make a solution, of which add a teaspoonful to a tablespoonful of lemon-juice diluted with a tablespoonful of water and drink during effervescence every three or four hours.

Fevers.—Next to its use as an anti-scorbutic (a cure for scurvy) lemon juice is most valuable as a drink (in febrile affections) in which the thirst is urgent and the bowels are not disordered. This is usually the case in eruptive and periodical fevers.

Headache.—A remedy which may very often be given with advantage for severe forms of headache is bromide of potassium in five- or ten-grain doses twice daily, followed by an ounce or two of effervescing lemonade, as prescribed under La Grippe (which see). If not very severe the effervescing draught (alone) will be found efficient and secure prompt relief.

Hemorrhages.—It not only assuages thirst, but directly counteracts the tendency to loss of blood. Administered as lemonade in one- or two-ounce doses as cold as possible.

Itching of Anus or Scrotum.—Lemon-juice has been used with advantage as a local application in itching of the genitalia (privates) and anus.

Jaundice.—Lemon-juice in tablespoonful doses several times a day is reputed to be a remedy for jaundice produced by congestion of the liver.

La Grippe.—As a mild diaphoretic and as acting on the kidneys, and to allay restlessness and watchfulness in fever use the following:

Lemon-juice and water, equal parts, enough to make four ounces; bicarbonate of potassium one drachm; water, three ounces.

Make and keep in separate solutions. To be mixed in tablespoonful doses several times daily and taken while effervescing.

Rheumatism and Gout.—Lemon-juice has been used with beneficial effects in acute and chronic rheumatic affections. According to the statement of a noted physician, "the sensible operation of the remedy consists in reducing the force and frequency of the pulse, a mitigation of severity of the attack and in securing an early relief from pain."

Prescribed in doses of one or two ounces of juice (freely diluted) three or four times a day. This is generally well tolerated, yet sometimes occasions severe griping or diarrhœa.

Scarlet Fever, Malarial Diseases (Chills and Fever).—Lemon juice furnishes a most agreeable and refreshing beverage and proves an admirable refrigerant.

It may be given with sweetened water in the shape of lemonade. This is an old English remedy, formerly called the "King's Cup," made as follows:

Add two lemons, sliced, and two ounces of sugar to two pints of boiling water, allowing this to digest till cold, when it is ready for use in ounce doses *ad libitum.* Or lemon-juice may be added to the mildly nutritive drinks, such as gum water, Irish moss tea, barley water, and so forth.

Scurvy.—One of the most beneficial applications of lemon is the use of its juice for the prevention and cure of scurvy. For this purpose ships destined for long voyages are always provided with a supply of the concentrated juice or (its equivalent) lime juice; from one to two ounces should be given every two to four hours diluted with an equal amount of water.

Syphilis.—In some cases of syphilis a cachetic or scorbutiform condition of the blood is apt to obtain, and in such fresh lemon-juice several times daily has been found a valuable adjunct to the regular treatment outlined for this disease.

The Lemon is the fruit of the *citrus limonum,* a native tree of India, but now naturalized in all warm climates. It is supposed that the Greeks and Romans were unacquainted with the lemon, which only became known to Europeans at the time of the Crusades. To-day it is known the world over, and its medical uses are numerous.

To Remove Tan from Face.—Rubbing the half of a cut lemon on face at night or bathing the face with lemon-juice, allowing same to dry, and washing it off carefully with castile soap and warm water every morning, is said to have proved very efficacious.

Vomiting.—The effervescing draught given under Erysipelas (which see) is one of the best remedies for allaying nausea or a tendency to sick

LICORICE (Glycyrrhiza).

(*See Plate XII.*)

LILY OF THE VALLEY (Convallaria).

(*See Plate X.*)

LIVER-WORT.

A strong tea of this plant, called also kindey plant, in teacupful doses four or five times daily, is recommended as an excellent remedy for kidney complaint.

MALE FERN (Aspidium).

Definition.—Aspidium is the rhizome of plants found in almost every part of the world. The rhizome has a slight odor and a bitter taste.

Use.—Male fern is used in the expulsion of tape worm. It probably kills the worms in addition to expelling them.

Manner of Using.—When it is suspected or known that a person has a tape worm the following treatment should be carried out. The person should either take no food at all for a day or two or the diet should consist of milk only. The drug should then be given in some agreeable form. It may be given in milk or mucilage. A purgative should follow the use of male fern.

MALT (Maltum).

Definition.—Malt is the seed of hordeum distichum, caused to enter the first stage of germination by artificial means and dried. Extract of malt is made with water at a moderate heat and evaporated to the consistency of thick honey.

Use.—Extract of malt is valuable as a food. It is easily assimilated.

Manner of Using.—Extract of malt may be taken alone or it may be taken in conjunction with cod-liver oil, mixing it with an equal quantity of cod-liver oil.

MARSHMALLOW (Althea).

Definition.—Marshmallow represents a root. It contains a substance called asparagin, upon which its virtues depend.

Use.—Asparagin renders the drug useful as a means of increasing the flow of the urine. Combined with medicinal lard althea makes an effective dressing in skin diseases. It has been employed also in cough mixtures.

Manner of Using.—The syrup is taken internally. For making a poultice the powdered root may be used.

MASTERWORT (Imperatoria Obstruthium).

Part used—the root.

It has been used with such beneficial effects as a diuretic, emmenagogue, stomachic and diaphoretic and in such a wide circle of complaints with so much success that it has gained the title of divine remedy. The dose of the infusion, made with an ounce of the root to a pint of water, is a teaspoonful every three or four hours.

MAY APPLE (Podophyllum).

Podophyllum is a slow cathartic acting upon the liver and the intestinal glands. On account of the smallness of the dose and the slight taste podophyllum is much used in the treatment of constipation of children. A grain may be dissolved in the spirit of ginger and a drop or two given on sugar.

MEADOW SAFFRON (Colchicum).

Definition.—Colchicum represents the corm and seed of a plant.

Use.—The chief use of colchicum is internally in the treatment of rheumatism.

MUSK-ROOT (Sumbul).

Part used—the root.

The virtues appear to be those of a nervous stimulant. It has been used with asserted success in diarrhœa, dysentery and malignant cholera; also in gastric spasm, hysteria, painful menstruation, palsy of the limbs, epilepsy and other nervous disorders. It may be given in infusion or decoction, and may be used very much as we use valerian.

MYRRH (Myrrha).

Definition.—Myrrh is a resinous exudation obtained from a tree. It appears as brownish-red masses.

Use.—Myrrh is slightly astringent and stimulant locally, hence its use as a mouth wash. Combined with other remedies it is sometimes employed as a cough medicine.

NAVY BEAN (Vicia Vulgaris).

A smooth, green bark. Yellow flowers and pods containing the beans are the parts employed. As a remedy for erysipelas it has gained quite a reputation on account of successful cures. It is used both externally and internally. For internal use about one ounce of the dried bark is boiled with one pint of water. Dose: One tablespoonful three times a day. It is a most cooling medicine to the system. For external use a paste is made with the bruised beans and applied to the erysipelatous parts. It rarely fails to relieve all inflammatory symptoms.

NUTGALL (Galla).

(*See Gallic Acid.*)

NUTMEG (Myristica).

Definition.—Nutmeg is the seed of a tree growing in the East Indies, but cultivated also in the West Indies and in South America.

Use.—Internally small doses favor digestion by stimulating the secretion of the gastric juice. It is used to disguise the taste of unpleasant mixtures and as a flavor.

Manner of Using.—The oil or the spirits may be used.

OATS (Avena).

Avena is the fruit of the avena sativa and is used as food in the form of oatmeal, gruel or porridge. It is a highly nutritious food and should be eaten with butter or cream. Skin eruptions, such as eczema, have been attributed to the use of oatmeal. Change of diet in these cases produces a cure for the eczema.

OLIVE OIL.

Olive oil is both a food and a medicine. Its nutritive powers are considerable and it acts as a lubricant of the digestive tract. It may also

be used externally in numerous ways. It is not to be considered as a cure-all nor should it be taken in excessive quantities as it imposes extra work upon the liver and may cause biliousness, but used in moderate quantities it has the effect of generally aiding the digestive organs in their work. It is recognized as being an especially effective remedy for gall stones. It is also of considerable value to those who are troubled with constipation, its lubricating qualities making it a healthful and natural regulator. Prospective mothers are almost invariably troubled with constipation; ordinary purgatives are irritant and are often dangerous at this period. A fairly free use of olive oil internally at this time combined with external use in the way of rubbing the abdomen will be found not only to give relief in the matter of constipation but will give an elasticity to the skin which enables it to stretch in such manner that scarring of the skin which so often accompanies maternity, is avoided.

As to the quantity one should take internally this depends upon the individual and also the general diet. Two or three tablespoonfuls per day will generally prove a satisfactory allowance, but those who are fond of it may double this quantity or more. It may be taken before, with or after meals or between meals, according to individual preferences. Larger quantities may naturally be taken where considerable acid fruit is included with the diet than in cases where such fruit is omitted. For those who do not like the taste of the oil it may usually be made palatable by adding a little lemon or other acid fruit juice, or by adding a pinch of salt.

Olive oil has been found of much value as a preventive of appendicitis, and for such purposes may be used advantageously both internally and externally. A few drops in the nose when suffering from cold will soften scabs and have general healing effect. It is also of value in enemas. Used externally it affords relief from aching joints and rheumatic conditions. It is of value for chapped skin and may be used advantageously in rubbing the whole body after a warm bath. In its natural form, however, it is inclined to darken the skin and to avoid this the coloring pigment should be removed by bleaching the oil through exposure to sunshine.

Swimmers find that by thoroughly rubbing the body with olive oil before entering the water, they are enabled to endure much greater cold and withstand fatigue in swimming long distances. It is said to promote the growth of hair, but whether this be so or not, it in any event makes an excellent treatment for the scalp, keeping it in healthy condition.

ONION.

Hardly any plant furnishes more or better home remedies than the onion. Cooked as a sauce and eaten freely it is a cure for constipation. Cut into slices and sprinkled with sugar, a syrup is formed which is excellent in croup, the dose being a teaspoonful every fifteen to twenty minutes, till relief is had. A crushed onion poultice will extract the heat and pain of a burn or scald. The squeezed juice of the onion, mixed with sugar, and given in teaspoonful doses every three or four hours, is highly recommended as a cure for bronchitis.

Boiled and mixed with flaxseed meal and a little vinegar it makes an excellent poultice which, placed across the chest and under the armpits, has been found efficacious in pneumonia. Raw sliced onions placed in a sleeping room where diphtheria, scarlet fever or other contagious disease is present, seem to act as a magnet in drawing the germs of disease. Onion syrup, prepared by sprinkling sliced onions with sugar, and taken in teaspoonful doses every fifteen minutes, until relief is obtained, is a favorite home remedy for croup. Free use of onions on the table is a preventive of constipation. An application of crushed onions to burns extracts the fire and relieves the pain. In bronchial affections onions afford a remedy, in the form of a syrup taken in teaspoonful doses, three or four times a day, or oftener if the case be severe.

OPIUM (Opium).

(*See Plate IX.*)

ORANGE (Aurantium).

Definition.—The orange represents the fruit of small trees which grow in warm regions of the Eastern and Western Hemispheres. There are two forms, the sweet orange and the bitter orange.

Use.—Like the juice of the lemon, orange juice may be taken in water as a cool drink, and is grateful particularly during the course of fevers. The different preparations of orange are pleasant as flavors. The preparation known as the elixir of orange is an agreeable vehicle for other remedies.

OREGON WILD GRAPE (Berberis Aquafolium).

Where the root cannot be obtained, the fluid extract, which is known as *Berberis Aquafolium,* may be purchased from druggists, the dose being

one-half teaspoonful in water three times a day and also it is recommended as a douche, one teaspoonful in a cup of water being thus used night and morning.

PEACH LEAVES (Amygdalus Persica).

Physicians who have tried the virtues of peach leaves as a cure for jaundice speak of them with praise. Steep a handful of the bruised leaves or twigs in enough cold water to cover them. The dose is a fourth of a teacupful three or four times daily. A tea made of peach leaves or bark is purgative and good for worms. It should be given in tablespoonful doses to adults, until it operates. Children should take teaspoonful doses. In two to four tablespoonful doses every two hours it will check the the vomiting in cholera morbus and morning sickness.

PENNYROYAL (Hedeoma-Hedeoma).

(*See Plate IX.*)

PEPPER, BLACK PEPPER (Piper).

Definition.—Pepper is the unripe fruit of the piper nigra of India.

Use.—Pepper is a condiment. It is stimulating to the digestive system and to the circulation. Pepper externally is an irritant.

PEPPERMINT.

Essence of peppermint, a teaspoonful to a tumbler of hot water, sipped occasionally, is both a preventive and cure of seasickness. Bruised and applied to the stomach it relieves nausea and vomiting. Given internally it relieves colic in infants.

PEPSIN (Pepsinum).

Definition.—Pepsin is one of the elements of the gastric juice. In cases of deficiency of this element there is presented one form of dyspepsia. The object, then, is to assist nature by replacing the pepsin. We therefor look to the lower animals for assistance and select the hog, calf or the sheep. The acid mucous secretion is scraped from the surface of the stomach, spread on a glass and dried in scales. Saccharated pepsin is pepsin obtained from the gastric mucous membrane of the hog mixed with sugar of milk. It is a white powder of a disagreeable odor and taste. A solution of this is made and forms liquor pepsin.

Manner of Using.—The powder may be used, or a rather pleasant liquid preparation called the wine of pepsin may be used.

PERUVIAN BARK (Cinchona).

Uses.—This drug has somewhat lost its former popularity, being replaced by quinine and other alkaloids obtained from the same bark. These alkaloids are the best vegetable tonic, as also the surest remedies in malaria. Quinine is also much used in fevers and inflammations. Many have a certain objection to this drug because an excess causes headache, noise in the ears and other disagreeable symptoms. These are, however, temporary, and should not stand in the way of a careful use of the remedy.

PINEAPPLE.

A tablespoonful of the juice of the pineapple, taken every three hours, is recommended as soothing in sore throat. The same may be used as a gargle after each dose.

PINK ROOT.

This plant offers an old standby for worms. An ounce of the root, mixed with four drachms of senna, should be steeped in a quart of water. The dose is two tablespoonfuls twice a day. If the root is used in the form of a powder; the dose is ten to twenty grains for children, and one to two teaspoonfuls for adults.

POISON NUT (Nux Vomica).

Definition.—Nux vomica is the seed of the strychnos nux vomica of East Indies. The seeds are disk-shaped, about an inch in diameter, and covered with silky hairs.

Use.—Nux vomica is one of our best tonics, as also one of the most dangerous poisons. These properties principally belong to strychnine, an alkaloid. It is also a good bitter tonic, which property is especially efficacious in the nervous system. It is often used in the treatment of dyspepsia.

Manner of Using.—The tincture of nux vomica is the preparation usually employed. Strychnine is used advisedly.

POTATO AS A CURE FOR ACHES AND PAINS.

Recent discoveries indicate that the common potato contains properties which, if properly applied, may relieve a number of aches and pains.

The medicinal properties of the potato are contained in its juice, and it is claimed on high medical authority that this juice produces wonderful results in curing swellings and other disordered conditions of the joints and muscles. In connection with the joints of the body there is to be found a fluid known as "synovia," which acts as a lubricant, and if through accident or disease this secretion ceases the joints become dry, feverish and painful and are unable to perform their functions. This condition is well illustrated by what is known as "white swelling" of the knee; the gland in the knee through which this lubricant (synovia) supplies the joint having become injured or diseased, the fluid escapes through the tissues and forms a swelling under the skin. Under ordinary treatment the trouble is not only difficult to remove, but even after the swelling has disappeared it is usually a long time before proper secretions are again set into activity and full use of the joint obtained. Among other instances where the stoppage of the flow of this fluid causes pain and trouble, may be mentioned gout, where the secretion is lacking in the great toe, and lumbago where there has been a cessation of synovic flow in the lumbar region.

The constituent parts of the potato are chiefly starch and potash salts, the curative properties being contained in the potash salts, which are found in the liquid part of the raw potato. Owing to its dense character, considerable pressure is necessary to extract the potato juice; after extraction it must be boiled down to about one-fifth of its original bulk; a small quantity of glycerine is then added as a preservative, in which form it may be used as a liniment or, with a mixture of lard, may be used as an ointment. The juice may be thus prepared at home or can be prepared by any druggist, the pharmaceutical name being *extractum solani liquidum*. The preparation is only used externally, being rubbed over the affected joints or muscles. Before application, hot fomentations should be applied to thoroughly open the pores, being continued until the skin is thoroughly red; the liniment or ointment is then well rubbed in, and in the case of a joint, a protective bandage is applied. This operation should be repeated every three hours until the pain and swelling are relieved. In cases of lumbago the patient should rest in bed until the remedy has had full effect. A sprained ankle or wrist should be kept tightly bandaged for a few days over an application of the ointment.

It is claimed that thus applied, not only does the potato juice quickly relieves pain, but that it so thoroughly re-establishes the synovic flow that

normal condtion of the part is so completely secured that there is little likelihood of reoccurrence of the trouble.

PUMPKIN (Curcurbita Pepo).

The seeds of the pumpkin afford a well recognized remedy for worms, retention of urine and inflammation of bladder and bowels. Oil of the seeds operates as a speedy diuretic in doses of from six to ten drops four or five times a day. If a tea of the seeds be used as a diuretic, it may be drank freely at intervals of two to three hours. Pumpkin seeds are highly recommended for the destruction and removal of tapeworm. The seeds should be peeled and beaten in with sugar till a paste is formed. Then dilute with milk, and drink freely, always on an empty stomach. In the course of a few hours the patient should take an active cathartic for the removal of the tapeworm, composed of a tablespoonful of castor oil and a teaspoonful of turpentine. The drug-stores now furnish a fluid extract of pumpkin seeds for the destruction of tapeworm, the dose being from a half to a whole tablespoonful every three or four hours, followed, as before mentioned, by a large dose of castor oil and turpentine.

PURPLE WILLOW HERB (Lythrum Salicaria).

Part used—the bark and root.

It is demulcent and astringent, and is efficacious in diarrhœa and chronic dysentery. The dose of the powdered bark is about a teaspoonful two or three times a day. A decoction of the root is prepared by boiling an ounce in a pint of water and given in doses of a tablespoonful every two or three hours.

RED PEPPER.

Red pepper is employed with great success as a gargle in scarlet fever. It is prepared by taking half a teaspoonful of the pepper and one tablespoonful of table salt to a half-pint of boiling water. Thoroughly mix and strain, and then add about half a teacupful of vinegar. Use frequently as a throat gargle, and give internally half a teaspoonful every hour to a child, doubling the amount for an adult. Red pepper is also recommended as a cure for the grippe, in the form of a tea of the pod, or of the ground pepper, a teaspoonful to half a pint of water. Place a teaspoonful of the tea in a glass of hot water, and drink slowly every three or four hours.

RED ROOT (Ceanothus Americanus).

A small, indigenous shrub, growing in the United States. The root is the part employed. Said to be useful in syphilitic complaints; given in the form of decoction; two drachms of the root to a pint of water. Dose: A teaspoonful four times a day. A strong infusion is useful in aphthous ulcers of the mouth, applied locally several times a day.

RHUBARB (Rheum).

Definition.—Rhubarb represents the root of a plant native in Asia.

Use.—In moderate doses rhubarb acts as a purgative and stomachic. In chronic constipation it is an excellent remedy. It is useful in the summer diarrhœa of children.

Manner of Using.—The aromatic syrup is a favorite method of administration. It may be given also in the form of pills.

SALT IN MEDICINE.

As Worm Cure.—For this purpose it is administered in large doses by the mouth, or, when the worms are lodged in the rectum, a strong solution is administered in the form of an enema.

Catarrh.—A warm, weak solution of salt and water (a half to one teaspoonful of salt to a tumblerful of warm water) sniffed up the nose night and morning oftentimes leads to a speedy cure in mild cases.

Cholera Morbus.—Salt solution by the mouth and as enemata is strongly recommended for this disease.

Diarrhœa and Dysentery.—In these affections salt has been satisfactorily administered in combination with lemon juice. A half drachm of salt to a tablespoonful or two of lemon-juice diluted, and repeated every two hours till relieved.

Emetic.—To produce vomiting the dose of salt is one or two tablespoonfuls in a tumblerful of water. A teaspoonful of mustard flour assists its action.

Felon.—Take common salt, roast it on a hot stove till dry as possible. Take a teaspoonful of it, also a teaspoonful of pulverized castile soap and a teaspoonful of Venice turpentine; mix them well into a poultice and apply to the felon. Renew twice daily, and in four or five days the felon will open, release the pent-up matter and get well.

Fits, Apoplexy, Convulsions, and so forth.—Salt placed on tongue dry acts admirably in these affections.

For External Application.—Salt is used for various external applications. Thus, a saturated solution, applied with friction, is employed as a counter-irritant in glandular enlargements and chronic diseases of the joints.

General Administration.—Common salt in small doses acts as a stimulant tonic and anthelmintic or worm cure; in larger ones as a purgative and emetic. It certainly promotes digestion, and the most universal animal appetency for it proves it to be a salutary stimulus in health. When taken in larger quantities than usual with food it is useful in some forms of dyspepsia, and, by giving greater tone to the digestive organs in weakly children, may correct the disposition to generate worms. On the sudden occurrence of hemoptysis or vomiting of blood it is usefully resorted to as an astringent in the dose of a teaspoonful, taken dry, and often proves successful in stopping the flow of blood.

Heartburn.—A few grains of table salt allowed to dissolve in the mouth and frequently repeated will ensure prompt relief.

Hemorrhage.—On the sudden occurrence of bleeding or vomiting of blood it is usefully resorted to to stop the flow, in the dose of a teaspoonful, taken dry.

History.—Salt is a necessary and indispensable seasoning of our food, and as such must doubtless have been known to and employed by the first individuals of our race. The earliest notice of it occurs in the writings of Moses (Genesis xix. 26; Leviticus ii. 13) and Homer (Iliad, lib., ix. 214). It has received various names, such as common salt, culinary salt and chloride of sodium, and so forth.

Hives.—Ordinary salt baths are of great value, promptly relieving the terrible itching. Two ounces of salt are added to about thirty gallons of warm water.

Inward Uses.—It is frequently used as an ingredient in stimulating enemata. The dose, as a tonic, is from ten grains to a drachm; as a cathartic, though seldom used for that purpose, from two drachms to half an ounce. In doses of from half an ounce to an ounce, dissolved in four or five times its weight of water, it frequently proves a prompt and efficient emetic, invigorating rather than depressing the powers of the system. When employed as a clyster it may be used in the amount of from one to three tablespoonfuls dissolved in a pint of water.

Local Application.—Externally applied in solution it is a stimulant, and may be used either locally or generally. Locally it is sometimes

employed as a fomentation in sprains and bruises; and as a general external application it forms the salt-water bath, a valuable remedy as a tonic and excitant in depraved conditions of the system, occurring especially in children, and supposed to be dependent on the scrofulous diathesis. A pound of salt dissolved in four gallons of water forms a solution of about the strength of sea-water, and suitable for a bath.

Malaria (Ague).—In the course of experiments made in Paris, France, common salt in half-ounce doses has been found very efficient and second only to quinine, but the dose being very bulky causes vomiting in many cases. But the suggestion is a valuable one, where quinine cannot be administered.

Purgative.—For producing evacuations from the bowels it is employed in the form of an enema. One or two tablespoonfuls of common salt dissolved in a pint or quart of starch water forms a very useful clyster.

Salt and the Blood.—It serves some important and essential uses in the animal economy. It is employed by the people of all nations, from the most refined to the most barbarous. It is an invariable constituent of the healthy blood.

In moderate quantities it promotes the appetite, assists digestion and assimilation.

Salt a Tonic.—In some diseases the moderate use of salt produces the effect of a tonic. It acts as a stimulant to the mucous membranes, the absorbent vessels and glands.

Sore Eyes.—A small pinch of salt (about three grains) added to an ounce of clear, filtered, boiled water makes a very soothing and beneficial eye-lotion. Apply with a small tube or dropper several times daily.

Sore Throat.—Gargling the throat with a weak solution of salt and water will often cure this difficulty without further treatment.

Sprains and Bruises.—Half fill a bottle with common salt; add good brandy till nearly full. Shake it well and allow to settle. Bathe the part with a soft linen cloth or sponge.

Stimulant.—As a stimulant it is rubbed on the chest in fainting, and so forth.

Stomach Pains or Gastrodynia.—Salt in a teaspoonful dose, dry, is used in some cases with considerable advantage.

Toothache Cure, Infallible.—Pulverize and mix alum and common salt in equal quantities; wet a small piece of cotton and cause the mixture to adhere to it; place in the hollow tooth. A sensation of coldness will be

first produced, which will gradually subside and with it the tormenting toothache.

NEW SALT REMEDY FOR SUNSTROKE.

Symptoms.—Throbbing in head, violent thirst, great restlessness; headache and fullness as if head would burst; red face, increased action of heart.

In extreme cases of sunstroke, where the patient is often in an unconscious condition, with a very weak, rapid pulse, and at times almost imperceptible, the injection under the skin of the forearm of a sterilized salt solution into the vein has been found most efficacious, and has been the means of saving many patients when the temperature has reached 109¾.

Treatment.—A vein of the arm is opened precisely as in the manner for bleeding, and a solution made by approximating one teaspoonful of common salt dissolved in one quart of water. This solution to be of the temperature of the blood, viz.: 98⅖ Fahrenheit.

By pursuing this treatment the blood-vessels are filled, the rapid action of the heart diminished, pulse becomes stronger and regular, and in association with the regulated cold bath or cold applications to the surface of the body, consciousness is restored within a very few hours. Care should be taken that the treatment, especially the cold bath, is not applied to cases of heat exhaustion, where the temperature is frequently subnormal. There is no doubt but what this recently instituted treatment by salt injections has been the means of saving many patients who have been affected with sunstroke. In sunstroke the fluid in the blood-vessels being below the normal quantity, the salt injection takes the place of the lost pabulum.

SARSAPARILLA (Sarsaparilla).

Definition.—Sarsaparilla represents a root from Mexico, Central America and Brazil.

Use.—Sarsaparilla is an alterative. It is also a vehicle to disguise the taste of unpleasant drugs.

SENNA OR SENA (Sena).

Use.—A violent cathartic, with watery stools, having the disadvantage that it is apt to produce strong colic. Generally given with some aromatic. The most pleasant form is the preparation known under the name of compound licorice powder.

SKULLCAP (Scutellaria Lateriflora).

Part used—the leaves.

Very efficacious as a nervine and successfully employed in neuralgic and convulsive affections, St. Vitus' dance, delirium tremens and nervous exhaustion. An infusion of the dried leaves is made with half an ounce of the leaves to a teacupful of water, to be drunk during the day. It has been found useful in epilepsy.

Description.—Its stem is erect, smooth and one or two feet high. The leaves are rather acute, opposite and supported upon long petioles. The flowers are small and of a pale blue color.

SOAPWORT (Saponaria Officinalis).

Part used—the root and leaves.

It has been used in venereal and scrofulous affections, cutaneous eruptions, and so forth. It appears to act as an alterative like sarsaparilla. It is given in the form of a decoction which may be taken freely. The expressed juice given in the quantity of half an ounce in the course of a day is claimed to be a specific in the cure of gonorrhœa.

Description.—The root and leaves are inodorous, of a bitterish-sweetish taste. They impart to water the property of forming a lather when agitated, like a solution of soap, whence the name of the plant was derived.

SPANISH FLIES (Cantharis Cantharides).

Definition.—Spanish flies represent the dried body of a beetle found in the South of Europe, especially in Spain.

Use.—Internally cantharides is a stimulant to the genito-urinary tract and externally it is employed as a counter-irritant. The tincture of cantharides combined with other remedies is often used in the treatment of alopecia or baldness.

Manner of Using.—When a blister is employed the part may be painted with cantharidal collodion or it may be covered with a rag spread with the cerate. Cantharides requires from six to ten hours to draw a blister, but it is better to remove the drug at the end of four or five hours.

STARCH (Amylum).

Definition.—Starch is a fine white powder, and is obtained from the seed of the zea mays. It forms a large part of rice, wheat and barley.

Use.—When boiling water is added to starch a very convenient poultice is furnished for local inflammations. Starch, when mixed with water, is a convenient antidote to most corrosive poisons, as it is usually close at hand or can be readily obtained.

Manner of Using.—Starch may be used locally or internally. It may also be used as the basis for an enema to be injected in the bowels.

STONE ROOT (Collinsonia Canadensis).

(*See Plate I.*)

This plant is used in numerous complaints in practice. A decoction of the fresh root, one ounce to the pint of water, has been used with advantage in hemorrhoids or piles, catarrh of the bladder, gravel and dropsy. The dose is one tablespoonful four times a day. The leaves are applied in the form of fomentation to wounds, bruises and sores, and in cases of internal abdominal pains.

SUGAR (Saccharum).

Definition.—Sugar is a product of the sugar-cane of sub-tropical countries.

Use.—Syrup which is used as a vehicle for the administration of drugs consists of 85 per cent. of sugar. Sugar of milk is a peculiar crystalline sugar obtained from the whey of cow's milk by evaporation and purified by recrystallization. It is used in pharmacy.

SWEET FERN (Comptonia Asplenifolia).

A shrubby plant. Grows in thin, sandy woods in New England. The root is the part used. Most useful in diarrhœa. Given in the form of decoction. Made with two ounces of the root, boiled in one and a half pints of water to a pint. Dose: A tablespoonful several times a day, as required.

TANNIC ACID (Acidum Tannicum).

Definition.—Tannic acid occurs in the form of pale yellow scales.

Use.—The chief effect of tannic acid is that of an astringent contracting the tissues and checking secretion. It is used as a chemical antidote in cases of poisoning.

Manner of Using.—As an antidote it is used in powder form, twenty grains being the amount usually given.

TARTARIC ACID (Acidum Tartaricum).

Definition.—Tartaric acid appears as colorless crystals. It is obtained by the decomposition of cream of tartar found in old wine casks.

Use.—This acid is one of the constituents of a Seidlitz powder, which is laxative in its effect. Rochelle salt, also laxative, is potassium and sodium tartrate.

Manner of Using.—The acid or its salts are used in solution in quantities to suit.

TEA (Camellia).

Definition.—This represents an infusion made from the dried leaves of the Chinese tea plant or Camellia Thea. It contains a substance known as theine.

Use.—Tea is a stimulant removing a sense of fatigue. While this is the ordinary effect of the use of tea there are some, particularly those of a nervous temperament, who cannot partake of it without ill effects.

TOBACCO (Tabacum).

Definition.—The leaves of the tobacco plant represent the part used. The tobacco plant is indigenous to the southern portions of this country. It was carried to Lisbon by the Spaniards and from there to France by Nicot in 1560.

Use.—When persons not accustomed to tobacco indulge in it emesis or vomiting, with great muscular relaxation, results. It is a stimulant to the salivary and intestinal secretions. Nicotine is a rapidly acting poison resembling hydrocyanic acid in its fatal effects. The power of increasing secretions along the alimentary canal, the stimulation of peristalsis and the function of the kidney are proper arguments in favor of moderate use of tobacco.

TOMATOES (Lycopersicum Esculentum).

The tomato remedy for cholera infantum meets with much favor by those who have tried it. It is prepared by adding sugar to peeled ripe tomatoes. The dose is a teaspoonful every half hour until relieved; then continue with like doses every two or three hours till a permanent cure is effected. Some remarkable cures are mentioned in connection with this simple remedy. Do not give the seed or pulp of the tomato.

TRAILING ARBUTUS (Eplgæ Repens).

A small, trailing plant, ovate leaves and small, fragrant flowers. It has been employed with marked success in diseases of the urinary organs and of the pelvic viscera generally. The leaves and stems are the parts used. An infusion is made with two ounces of either to one and a half pints of water, boiled to one pint. Dose: A tablespoonful three or four times a day.

TURPENTINE TREE.

This species of pine yields the oil and spirits of turpentine so useful in the cure of diseases. Application to the back of the neck of a cloth thoroughly wetted with spirits of turpentine will afford speedy relief in cases of fits and convulsions. Five drops of the spirits on a little sugar, swallowed slowly, and once or twice a day will cure sore throat. In cases of dysentery, ten drops on a little sugar taken every four hours usually effects a cure. A turpentine liniment, valuable in cases of sprains, bruises and rheumatism, is made of equal parts of spirits of turpentine and vinegar, to which has been added the yolk of one egg.

UNICORN ROOT.

This is sometimes called star-root. It ranks as an excellent remedy for falling of the womb. Make it into a strong tea, and take half a teaspoonful three times a day.

VALERIAN (Valeriana).

(*See Plate XIV.*)

WAHOO (Euonymus Atropurpureus).

Small shrub, which, in autumn, from their rich red color, have obtained for them the name of burning bush. Most effective in the different forms of dropsy. The root is the part employed. Given in the form of decoction, one ounce to the pint of water. Dose: A wineglassful three or four times a day.

WALL PELLITORY (Parietaria Officinalis).

Part used—the bark.

It is used in complaints of the urinary passages, dropsy and febrile affections in the form of a decoction made with an ounce of the bark to a

pint of water, the dose of which is a tablespoonful every three or four hours. The expressed juice is also used and the fresh plant applied in the form of a poultice to painful tumors.

WATER HEMLOCK (Phellandrium Aquaticum).

Part used—the seeds.

They have been used moist successfully in chronic pectoral affections, such as bronchitis, pulmonary consumption, asthma, and so forth, and in dyspepsia and intermittent fever. The dose is from five to six grains every three or four hours.

Description.—The seeds have been used for a considerable time in the treatment of disease. They are from a line to a line and a half in length, narrow above, somewhat compressed, marked with ten delicate ribs. Their color is yellowish brown, the odor strong, their taste acrid and aromatic. In over-doses they produce vertigo, intoxication and other narcotic effects.

WAX (Cera).

Wax is a concrete substance prepared by the apis mellifica. It forms the honeycomb. It is used to give consistency to ointments and suppositories.

WHITE MUSTARD (Sinapis Alba).

(*See Plate V.*)

WHITE OAK BARK.

It has been used successfully to cure the leucorrhea or whites. Boil an ounce of the root in a pint and a half of water down to a pint. Use as an injection.

Or, employ as an injection one-half ounce of the fluid extract of Canadian pine (*Pinus Canadensis*) to a pint of tepid water. Use this twice a day with a syringe, or white oak bark one ounce to a pint.

WHITE POND LILY.

A tea of this plant injected to the neck of the womb is highly recommended as a cure for ulceration of that organ. At the same time the tea should be taken internally as an accessory treatment, the dose being half a teacupful two or three times daily. If the fluid extract of the plant is used, the dose should range from four to twenty drops three times a day.

WILD INDIGO (Baptisia Tinctoria).

Part used—the root.

It has proved useful in scarlet fever, typhus fever and in that state of the system which attends gangrene or mortification. It is highly recommended as an external application to obstinate and painful ulcers. It is given in decoction made in the proportion of an ounce of the root to a pint of water, of which two tablespoonfuls are administered every four or eight hours.

WILD YAM.

This plant has come into modern favor as a remedy for appendicitis. It is used by mixing a teaspoonful of the extract in a half tumbler of water, and taking a teaspoonful of the mixture every half hour. When relief comes diminish the dose to once every hour or two. This treatment is regarded by some doctors as the best the profession affords.

WINTERGREEN TEA BERRY (Gaultheria).

Definition.—Wintergreen represents the leaves of a small plant growing in North America.

Use.—Taken internally the oil is antiseptic and antipyretic. This latter refers to its property of reducing the temperature. It is used in the treatment of articular or inflammatory rheumatism. Locally the oil combined with olive oil makes a good application for rheumatic pains.

Manner of Using.—The oil is used internally and locally.

WORMSEED (Santonici Semen).

Part used—the seeds.

They contain a volatile oil, to which its virtues have been ascribed. But it owes its efficacy to a peculiar principle which it contains called santonin, used in the treatment of worms. The dose is from one to four grains twice a day. The dose of the powdered seeds is from ten to thirty grains, which should be repeated morning and evening for several days and then followed by a brisk cathartic. It has also been employed with success in intermittent fever.

YELLOW ROOT (Hydrastis Canadensis).

Part used—the root.

Possesses the virtues of the ordinary bitters and popularly employed as a tonic. Used in dyspepsia and stomach affections, and as a topical application to ulcers and sores in the form of a decoction made with a

drachm of the dried root to a pint of water and a syringeful injected three times a day. It is most useful in gonorrhœa.

YERBA REUMA.

Fluid extract of yerba reuma is a favorite cure for catarrhal affections. It is used by pouring a small quantity of the liquid into the hollow of the hand, placing the finger on one nostril and sniffing the liquid into the other nostril. Then do the same with the other nostril. This should be repeated four or five times daily. If the catarrhal discharge is copious, the nostrils should first be cleansed by previous sniffs of warm water; and if the discharge be offensive a half teaspoonful of carbolic acid may be added to the water.

HOW TO PREPARE HERBS.

When a plant has reached the stage of its growth when all its properties are fullest it is the proper time to gather it.

Roots.—The best time to gather roots is before the sap rises in the spring, but they may be taken after the leaves have dried in the fall.

Barks.—Gather in the fall or early spring, and, after removing the outside portion of the bark, cut and put in a dry place.

Berries and Fruits.—Hang in a cool, dry place or spread on tables or shelves.

Seeds and Flowers.—When they have fully ripened, place to dry in a shady place.

Medical Herbs.—Gather any time while blooming, before the autumn frosts, and dry in the shade.

Leaves.—Should be collected when the bloom is on the plant, and hung or spread in a current of air so as to be hastily dried.

All druggists know that tin canisters are the best in which to keep powders, where they can be dry and in a dark place roots in barrels or wooden cases and extracts and tinctures in jars and bottles away from the light.

How to Prepare Herbs for Use.—To make an effusion or decoction, take one to two ounces of the plant, bruise, and add a quart of water. Tinctures are made by taking two ounces of the powdered article and adding a quart of alcohol and letting stand two weeks. Essences are made by dissolving one to two ounces of the essential oils in a quart of alcohol. Infusions or teas are made by taking a half cupful of the herb and allowing to simmer slowly over the fire. Decoctions are made in the same way, only make sure to extract the full strength from the herb.

HOW TO MAKE TINCTURES.

Tinctures, in the pharmaceutical sense of the term, are solutions of medical substances in alcohol or diluted alcohol, prepared by maceration, digestion or percolation.

Only Dry Ingredients.—In the preparation of the tinctures the medicine should be in the dry state, and properly comminuted by being bruised, sliced or pulverized. It is usually better in the condition of a coarse than of a very fine powder, as in the latter it is apt to agglutinate, and this presents an impediment to the penetration of the menstruum.

The Mixing.—When several substances differing in solubility are employed they should be added successively to the splint; those least soluble first, those most so last, as otherwise the menstruum might become saturated with the ingredient for which it has the strongest affinity, and thus be rendered incapable of dissolving a due portion of the others.

The Care Needed.—Care should always be taken to keep the vessels well stopped in order to prevent the evaporating of the alcohol. The materials should be frequently shaken during the digestion or maceration, and this caution is especially necessary when the substance acted on is in the state of powder. The tincture should not be used until the maceration is completed, when it should be separated from the dregs either by simply filtering it through paper, or, when force is requisite, by first expressing it through linen, and subsequently filtering.

Narcotic Tinctures.—Tinctures prepared by adding alcohol to the expressed juices of plants have been long in use. The tinctures of some of the narcotic plants, as those of conium, hyoscyamus and belladonna, are prepared in this manner. To the expressed juice, after it has stood twenty-four hours and deposited its feculent matter, alcohol of .0838 is to be added in the proportion of one part by measure to four of the juice, and after another period of twenty-four hours the liquor is to be filtered. This proportion of alcohol is sufficient for the preservation of the juice, while it causes the precipitation of the mucilaginous matter. But, though these preserved juices are often energetic preparations, yet it is obvious the tinctures prepared from the fresh plant must be still more efficient, as they contain necessarily not only the soluble active matter of the juice but that also which is left in the solid residue of the plant.

Keeping of Tinctures.—Tinctures should be kept in bottles well stoppered in order to prevent evaporation, which, in some instances, might be attended with serious inconvenience, by increasing their strength beyond the official standard.

Doses of Tinctures.—Medicines are most conveniently administered in tinctures which act in small doses, as the proportion of alcohol in which they are dissolved is insufficient to produce an appreciable effect. Those which must be given in large doses should be cautiously employed in this form lest the injury done by the menstruum should more than counterbalance their beneficial operation. This remark is particularly applicable to chronic cases, in which the use of tinctures is apt to lead to the formation of habits of intemperance.

HOW TO MAKE FOMENTATIONS.

A sort of partial bathing by the application of cloths which have been previously dipped in hot water or in some medicated decoction. They act chiefly by virtue of their warmth and moisture, except in the case of narcotic fomentations, where some additional effect is obtained.

A Dry Fomentation is a warm, dry application to a part, as a hot brick wrapped in flannel, a bag half filled with chamomile flowers made hot, and so forth.

Fomentation of Herbs.—The herbs ordinarily sold by the apothecary for this purpose are southernwood, poppy heads, chamomile flowers, each two parts; bay leaves, one part. Four ounces of these to six pints of water.

HOW TO MAKE COMPRESSES.

Folded pieces of lint or rag so contrived as, by the aid of a bandage, to make due pressure upon any part, according to their shape, direction and use. Compresses have been called long, square, triangular, split, uniting, cubiform, and so forth.

The compress of the hydropathists is a cloth well wetted with cold water, applied to the surface near the supposed seat of disease, securely covered with a dry cloth, and changed as often as it becomes dry. It is sometimes covered with a layer of oiled silk to prevent evaporation.

HOW TO MAKE DECOCTIONS.

Decoctions are solutions of vegetable principles obtained by boiling the substances containing these principles in water. Decoction is preferred to infusion as a mode of extracting the virtues of plants when the call for the remedy is urgent and the greatest possible activity in the preparation is desirable. The process should be conducted in a covered

vessel, so as to confine the vapor over the surface of the liquid, and thus prevent the access of atmospheric air which sometimes exerts an injurious agency upon the active principle. The boiling, moreover, should not as a general rule be long continued, as the ingredients of the vegetable are apt to react on each other, and thus lose to a greater or less extent their original character. The substance should, if dry, be either powdered or well bruised; if fresh, should be sliced, so that it may present an extensive surface to the action of the solvent.

All vegetable substances are not proper objects for decoction. In many the active principle is volatile at a boiling heat, in others it undergoes some change unfavorable to its activity, and in a third set is associated with inefficient or nauseous principles, which, though insoluble or but slightly soluble in cool water, are abundantly extracted by hot liquid at the boiling temperature, and thus injure the preparation. In such cases infusion is preferable to decoction. Besides, by the latter process, more matter is often dissolved than the water can retain, so that upon cooling a precipitation takes place and the liquid is rendered turbid. When the active principle is thus dissolved in excess, the decoction should always be strained while hot, so that the matter which separates on cooling may be mixed again with the fluid by agitation at the time of administering the remedy.

As a general rule glass or earthenware vessels should be preferred, as those made of metal are sometimes corroded by the ingredients of the decoction, which thus becomes contaminated. Decoctions, from the mutual reaction of their constituents as well as from the influence of the air, are apt to spoil in a short time. Hence they should be prepared only when wanted for use, and should not be kept in warm weather for a longer period than forty-eight hours.

BOOK XIV

Treats of Alcohol and Narcotics. Alcoholism and the Tobacco and Drug Habits are fully discussed and the newest and best cures given.

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Book XIV

ALCOHOL AND NARCOTICS

ALCOHOLISM—ITS TREATMENT AND CURE.

Use of Alcohol.—The habitual and excessive use of alcoholic beverages is harmful in the extreme to the moral nature. Startling facts corroborate this opinion. They are historic. Scarcely a community is exempt from the evils of intemperance. One result most common is the loss of self-respect. Men addicted to this vice descend to the grossest immoralities. Before the taste and burning desire for liquor was acquired they were decorous and dignified; but, degraded by the demoralizing appetite, they present the most pitiable spectacle of self-humiliation, all moral excellence disowned or lost. Nor is this result common to men of moderate talents or low extraction.

Degrades Genius.—Some of the brightest geniuses have exiled themselves from the social circle of which they were ornaments, or have been banished therefrom, because of their violation of the courtesies and conventionalities of polite life. They have deliberately forfeited that conservative element in human nature on which are based true dignity and manliness.

Destroys Social Affections.—This baneful habit makes fearful inroads on the social affections. Friendships of long standing have been broken up because of the unreasonable exactions on patience and sympathy demanded by the inebriate. Drunken husbands have exercised a tyranny over refined, cultured and amiable wives till, after long years of endurance, the sufferer has gone down broken-hearted to the grave. These are not cases confined to a few families; they are numbered by the thousands.

Crushes Paternal Feeling.—The paternal relation has been made the occasion of untold pain to children who have become under the rule of

an intemperate father the heirs of privation, cruelty and neglect. The paternal feeling has gradually been crushed out. There are records of feminine frailty of like character where the mother-instincts have been so far obliterated that one shudders to think of a degradation so abject being possible to the womanly nature.

Loss of Ambition.—*Loss of manly ambition* is one of the sad results of this habit. The foe has invaded the precincts of the bar, the senate-chamber, the sacred desk, and hurled down to the dust brilliant men, who sacrificed honor, purity, holiness, popular affection and flattering possibilities of wealth and fame at the shrine of this evil. This is a melancholy page in the history of many great names.

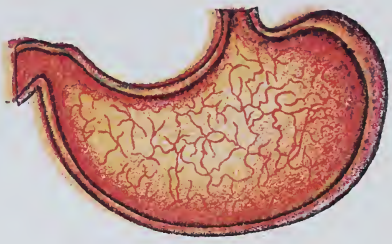
Stifles Conscience.—The great moral monitor, *the conscience,* often is made to hush its admonitions and become silent or dead. Acts the most abhorrent to men sober, by men drunk are committed without shame. Inflamed by a species of madness produced by drink, men perpetrate the darkest deeds. In fact, criminals have fortified their failing courage by repeated draughts of liquor to nerve them to the commission of some premeditated crime. Our civil tribunals are tortured with cases which would never be brought into court but for crime committed by men in a state of intoxication. So enormous, so brutal, have been some offences against the rights of society, and of individuals as well, that serious doubts arise whether the criminal has a conscientious scruple. The wreck of this high moral authority and guide is a sad monument of depravity.

Destroys the Will.—There is another great moral force which is not exempt from the ravages of intemperance—*the will.* This power is the crowning glory of human nature. It is a gift of imperial authority with which man is dowered. When that is enfeebled or destroyed, the creature is unmanned, the sceptre falls from his hands. This regal quality may be enslaved by the vice of intemperance, and then the fate of the unfortunate victim is sealed. There is then no prospect, no promise, of reformation. The farther the victim goes, the greater the momentum toward the inevitable doom. The facility of wrong-doing and the tendency grow in a fearful ratio, until he that was a strong man in will-power is enslaved, and is impelled along on the down grade to the last asylum, the grave.

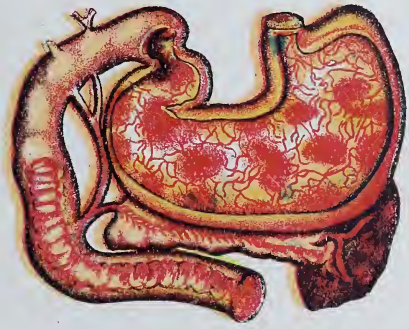
General Evil Effects.—Thus we trace the effects of a habit that has been a problem to physician, philosopher, jurist and minister. It is a question interesting to all students of human nature. The humanitarian is startled at the ruin the evil entails on the moral nature. The philan-

ACTUAL EFFECT OF ALCOHOLIC LIQUORS ON THE HUMAN STOMACH AND INTESTINES.

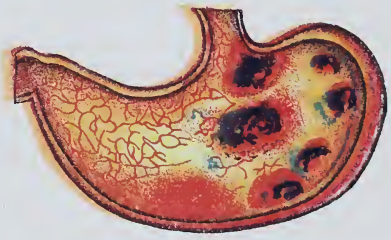
A healthy stomach



Effect of a few glasses of intoxicants

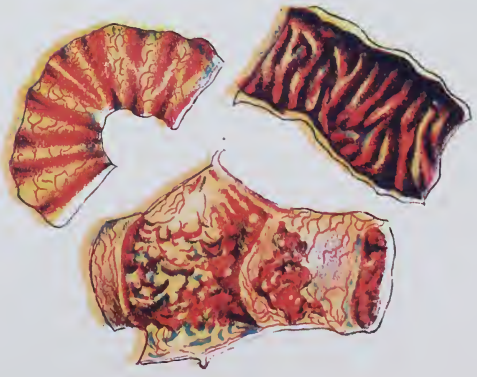


A stomach after ten or fifteen days continuous drinking.



Last stages of an ulcerated stomach of an habitual drinker of intoxicants.

Last stages of delirium tremens



Effect of intemperance on the intestines.

thropist cannot contemplate unmoved the arena of disaster on which scenes so terrible transpire. The ravages of the monster are universal in their extent and complete in their character. The keenest moral sense is deadened, ennobling aspirations are extinguished, moral beauty is eclipsed. Chastity is ridiculed, virtue defamed, honesty despised, honor debased. Passions reign, selfishness is supreme. All excellence loses its lustre. These and many others are the bitter fruits of this appalling evil.

Growth of the Habit.—Young and brilliant minds, noble and generous natures, yield most easily to the pressure of high artificial stimulation. At the beginning of the formation of the habit the effect on body and mind is invigorating and inspiring for a season. Life becomes during the delusive inflation a delirium of delight. The victim feels richer, more generous, more genial. The present is radiant and rosy, the future aflame with an aureole of glory. To these ignitable souls drink seems the elixir of life, the fabled nectar of the gods. But at the last, when the chains of habit are riveted, the victim, no longer free, but a slave, experiences all the horrors of remorse and self-condemnation. But his will is too enfeebled to break the shackles or resist the wand of the enchantress. He is numbered with that vast army, nearly one hundred thousand strong, who annually hasten to that dreary domain where the drunkard's journey ends.

Hereditary Effects.—These unfortunates often leave behind to their offspring a legacy of mental and moral derangement. In a work entitled *A Physician's Problems* the history of four generations of a family is given to illustrate this theory of heredity. The facts are related as corroborative of the opinion that mental and moral tendencies and characteristics of the offspring are in a large measure affected by the vicious habits of intemperate parents. Homicidal and suicidal inclinations, melancholy, disordered affections, gross impulses, were tracked along down to the fourth generation, when, fortunately, the race terminated. The reader is referred to the collection of facts in the book named as of great scientific import on this subject.

Other Food Sufficient.—There are those who have never experienced in themselves the dreadful effects of intemperance, having never used intoxicating liquors. The abstinence in these persons—and they are numerous—appears to favor the impression that except in disease no other stimulus is needed for a full mental, moral and physical manhood than that which food, rest, occupation and pure air supply. The moral

well-being of the human race would no doubt be best subserved by plain diet, pure emotion and high thought.

THE GOLD CURE FOR DRUNKENNESS.

The Gold Cure for drunkenness, including the Keely Cure and some other systems, has many ardent advocates and unquestionably has made some wonderful cures. Without claiming for it all that these advocates do, we give below what we believe to be the most approved Gold Cure formula, and also state the claims of its supporters.

Formula of the Cure.—While the treatment of nervous exhaustion, alcoholism, and so forth, is more particularly hygienic and dietetic, yet it is often impossible to dispense entirely with drugs. Recently the following formula has been widely recommended in such cases:

FORMULA.

Arsenious acid	19 grains
Tribromide of gold	14 grains
Bromine water	sufficient
Distilled water	sufficient

Ten minims of this solution for injection equals one-thirty-second grain of gold tribromide. In this form it should be given by a physician.

The physiological action of this remedy is most remarkable. It is an active tonic, powerful sedative and destroys the appetite or cravings for alcoholic stimulants.

Its Effects on the System.—In those forms of dyspepsia caused by indulgence in alcoholic stimulants, which are associated with the formation of gases, acid eructations and fermentative action in the contents of the stomach, in fact, where there is a retention or over-production of noxious products, the indications are to prevent the absorption of poisonous material or to destroy this poison within the organism by stimulating the liver and to eliminate the poison through the skin, kidneys and intestines. This the cure accomplishes in a most marked degree, and many claim will give entire relief.

Combating the Evil.—Our knowledge of the method in which drugs remove the cause of disease and counteract its effects greatly increases our power of lessening suffering, but we require something more. We must combat the evils produced by disease at all points of attack.

Administration of the Cure.—The more full our knowledge of the

mode of action of the new agents, the better our information about their effects upon the organs and tissues, the less likely our judgment concerning them goes astray. Knowledge of the action of drugs must be combined with careful observation of their curative influence. Therefore, having secured the right drug, it must be administered as the old painter mixed his colors, "with brains." The question of age, sex, constitution, dosage, and so forth, must all be considered. Individuals of susceptible nervous temperament will require minute doses, frequently repeated. If we are treating a local lesion we apply our remedies right to the spot. So drugs have their affinities, and, given in the proper indications, go straight to the diseased area. So with the cure, in nervous prostration from excesses it relieves because it is a diffusible, non-reactive stimulant, keeping the threadbare areas constantly bathed in fresh blood and giving them an opportunity to recuperate.

Effect of Alcohol.—We know that the presence of alcohol in the blood directly lessens the efficacy of respiration in proportion to the quantity present. In other words, it produces that condition in which we have a congested state of the brain. It is manifested by headache, delusions, mania, and so forth.

Accessory Treatment.—For the persistent retching and vomiting, or for the headache and wakefulness following a debauch, teaspoonful doses of fluid extract of coco, with a little elixir valerianate of ammonia, in conjunction with the cure, will be found a palatable, prompt and uniform restorative.

The Most Modern Cure.—It is claimed by its advocates that this system is the most modern, scientific and rational, and the most eminently satisfactory method of destroying the craving and appetite for alcoholic stimulants which has yet been discovered and that it permanently reinvigorates the functions, and, in fact, all the functions of the body.

Cures Even Last Stages.—It is claimed by its advocates that this treatment takes a person suffering with the drink crave or habit, even if he has reached the stage of delirium tremens, and within three or four weeks restores him to perfect health without loss of time from business or work, and effectually destroys all appetite for liquor to which he was a slave before commencing the treatment.

Take Regularly.—It is to be emphasized that the medicine is to be taken regularly four or five times a day. After a few days' use an improvement in the general health should be noticeable. The medicine if scientifically administered produces no ill effects. On the contrary, it

builds up the system, tones up the nerves, improves the appetite and strengthens every function of the body and will destroy the diseased appetite for alcoholic stimulants, whether the patient is a confirmed drunkard or a "tippler"—or a social drinker.

Perseverance Necessary.—One of the greatest obstacles in using this remedy is the over-confidence of the patient who discontinues the medicine when he begins to feel all right. It is a fatal mistake to imagine he is cured then. His system is by no means free from alcohol. If he were to die at this stage of the treatment—that is, a couple of weeks after using the medicine—and his brain be removed, it would be found so saturated with alcohol that it would burn with a blue flame, as an alcohol lamp does when a lighted match is applied. Not only is the body still impregnated with alcohol, but the nervous organism is not sufficiently restored to withstand the temptation which is sure to rise up as an evil spirit before him and lure him again to destruction.

Benefits from the Start.—The benefit of the medicine is felt from the beginning, and the patient is afforded relief at once. After three days he refuses liquor voluntarily, and each day the desire decreases until a complete cure is effected.

TEMPERATE AND INTEMPERATE LIFE CHANCES.

An intemperate person's chance of living is—

At 20 years of age	=	15.6	years.
At 30 "	=	13.8	"
At 40 "	=	11.6	"
At 50 "	=	10.8	"
At 60 "	=	8.9	"

A temperate person's chance of living is—

At 20 years of age	=	44.2	years.
At 30 "	=	36.6	"
At 40 "	=	28.8	"
At 50 "	=	21.25	"
At 60 "	=	14.285	"

The average duration of life after beginning the habit of intemperance is—

For laboring men, mechanics, etc.....18 years.
For merchants, traders and commercial men .....17 "
For professional men.....15 "
For females.....14 "

TOBACCO HABIT AND CURE.

The use of tobacco in one form or another is so universal that to decry its use is apt to meet with well-fought opposition by a large section of the world's inhabitants. Nevertheless there are many and strong arguments against its use. It is true that it has the power of increasing secretions along the alimentary canal, the stimulation of peristalsis and the function of the kidneys when used in moderation, and it is also undeniable that many users of tobacco remain healthy and live to old age. Yet the arguments against its use are many, and those which follow are worthy the consideration of both users and nonusers.

Nicotine.—There is no deadlier poison in nature than Nicotine. A drop or two of nicotine is sufficient to cause death. Like all poisons it is highly stimulating for the instant, soon to be followed by its death-like effects. It is the peculiar poison which tobacco in any and all of its forms yields. The tobacco chewer, snuff taker, cigar smoker, and cigarette fiend, no matter what his or her reason be for indulgence in the weed, is simply administering poison to the vitals.

Excuse for the Habit.—To be sure, the administration of poison to oneself through the agency of the plug, cigar, cigarette or snuff is not immediately dangerous. Many excuse such unwise administration on the plea that tobacco calms their nerves and conduces to sleep and comfort. Others say it is a sedative that conduces to thought. It is generally supplied to soldiers on the theory that it keeps them contented in camp, enables them to beter withstand the fatigue of long marches, and in a limited sense supplies the lack of food. But most, if not all, of these claims are imaginary. They are made, as a rule, by slaves of the habit, and as a justification of their folly.

Tobacco Facts.—The boy or girl who uses tobacco before reaching maturity is sure to wreck the nervous system and take a long step toward idiocy or insanity. Perfect, clean, energetic and acceptable manhood or womanhood is impossible for a youthful tobacco poisoner. No matter how slow the administration of the poison may be, it is relatively quicker

in its action than upon older people, because young nerves are the more tender and sensitive, more easily affected. As between the user and non-user of tobacco the latter is preferred every time. The youth who uses tobacco before maturity is his own greatest enemy, and readily ranks as a crass fool.

Adult Tobacco Users.—It is to be doubted whether any sane adult ever deliberately learned the tobacco habit. They either imitate others, lest they appear odd, or the habit has crept insidiously on them. Again, it is to be doubted whether a sane man exists who does not deprecate the habit and wish he were rid of it, and this deprecation exists in spite of the fact that he is ready for excuses for indulging the habit. In this respect tobacco users are open to the charge of inconsistency.

The Force of Habit.—Habit is a hard master, a veritable tyrant. It gloats in its triumphs and laughs while its slave writhes. So tyrannical and brutal is it that, as in the case of alcohol, it causes such degeneracy of tissues and organs as to take rank with actual disease, that of alcoholism. This is in some sense true of the tobacco habit. The difficulty of ridding oneself of it leads to the belief that it really weakens the will power and those forces which contribute to moral self-control.

Uselessness of the Habit.—No non-user of tobacco ever felt the worse or expressed regret over his abstentation. No user of tobacco ever denied that the habit is—

1st. A filthy one, in that it begets frequent spitting of stained saliva by chewers, sickening smoke odors by smokers, and discharge of discolored mucous by snuffers. Add to this the disgustingly odorous smoke of the cigarette fiend, and then wonder what worse in the way of filth can be realized.

2d. No matter what the natural constitution or the excuse, the habit is a dangerous one. It grows by what it feeds upon, and leads to gradual and insidious wreckage of the finer sensibilities and active nerve forces.

3d. It is an expensive habit, often entailing poverty, and always diminishing the recompense of labor. In the families of those who earn meagre support its expensiveness is almost the equivalent of robbery of wife and children. Destitution lies in the wake of tobacco almost as surely as in that of alcohol.

4th. It is an inconvenient habit and very often interferes with work, however much some may claim that it increases the ability to work.

Is There a Cure?—Yes. But not outside of the man's self. To introduce tobacco substitutes is not a cure, for very often the whole to-

bacco habits consists in the mere presence of a mere quid in the mouth or a cigar in the mouth. To keep the nervous system up to the tobacco tone by means of drugs would be to introduce into the system something which might lead to worse results than nicotine poison. It is all with the man. He should bring his mightiest will-power to bear upon the habit. He should never forget all the inconveniences and harmful results of indulgence. Bear them in mind; magnify them, if possible. Shape up every fibre to combat the situation. Resolve to be a free man. Persevere in the resolve. Weaken at no point of conflict nor at any time. Two or three weeks of abstentation will brace the will-power. It will feel encouraged by triumph, will grow stronger and stronger, and finally rejoice in entire mastery of the habit.

ONE DOZEN GOOD REASONS WHY A BOY SHOULD NOT USE TOBACCO.

1st. Cigarettes or tobacco in any form hinder the growth and injure the nerves and health.

2d. Cigarettes foster the tobacco habit, and may make any boy a slave to it.

3d. The cigarette habit does not help a boy in his lifework, and may prevent him from obtaining a good position in business.

4th. Most all reliable business establishments refuse to employ boys who smoke cigarettes.

5th. The following are among the poisons and drugs used in the manufacture of cigarettes: Arsenic, Creosote, Nicotine, Opium, Saltpetre, Tonca flavoring and Rum, all of which are harmful.

6th. Cigarette smoking makes a boy dull and stupid, impairs his memory and prevents his advance in school.

7th. Smoking creates an unnatural thirst, which may lead to drinking intoxicating liquors.

8th. Smoking is a selfish habit which may cause annoyance, discomfort and distress to others.

9th. Tobacco affects the eye, ear and nose, or sight, hearing and smelling, and also the heart.

10th. It costs more than most boys can afford to pay to have their nerves and health ruined.

11th. Smoking is a useless and expensive habit, and always does harm in a greater or less degree.

12th. It is also a filthy habit and defiles the body, and anything

that defiles or injures the body is a sin against God, who created man in His own image.

THE DRUG HABIT.

Narcotics in General.—The most common narcotic in use is probably tobacco, but cases which demonstrate its injury to the morals are so few that no dogmatic opinion can be given, except that its excessive use in the cigarette form, as also in the ordinary ways of chewing, smoking and snuffing, has a tendency to foster in the young inclinations destructive of a high moral tone. Hasheesh, opium, chloral, when used habitually and excessively, have been known so to injure the health and disarrange the mental action that the moral sense protests against their use. Under the prescription of a physician they may be used to allay pain or produce sleep in restless invalids, but the unprofessional use of them is extremely fatal to mind and morals, dulling and stupefying one and producing erratic action in the other. The excessive habitual use of these artificial stimulants creates a morbid moral state unfavorable to the promptings of duty, and promoting a condition unsuited to meditation on moral subjects, especially where the victim is deprived temporarily of the stimulus. The longing, the irrepressible sense of uneasiness, the restlessness, which the sufferer, deprived of his habitual ration, endures, indicates a moral as well as a mental state unhealthy and perverted.

At a conservative estimate there are to-day from three to five thousand Americans—male and female—who are incurably addicted to the smoking of opium twice a day, and this is only one item in a startling list, for irrefutable statistics prove that from New York to San Francisco, and from Canada to the Gulf of Mexico, there is a steady increase also in the consumption of acetanilid, acetphenetidin, antipyrin, phenacetin, caffein, codein, dionin and heroin.

There has been a steady increase also in the use of other drugs that are almost if not quite as destructive to mind and body as opium. Of cocaine, the most insidious of known narcotics, a drug that wrecks its victim more swiftly and surely than even opium, there is an enormous quantity being used in this country. Despite the enactment of drastic laws looking to the suppression of illicit traffic in cocaine, it is estimated that between 125,000 and 175,000 ounces are annually consumed in this country. The drug has many legitimate uses, but of the vast quantity annually consumed, it is estimated that over fifty thousand ounces go to wreck the bodies, minds and souls of its unhappy victims.

Hundreds of thousands of Americans are constantly using "headache powders" that contain acetanilid, a dangerous drug, other thousands cannot sleep without swallowing a quantity of chloral hydrate, which is the "knock-out drops" of the professional thief. It is not too much to say that any girl, if she be so minded, can obtain opium, morphine, cocaine, or any other of the habit-forming drugs as easily as a factory girl can buy her cheap and fiery spirits. Nor is the statement exaggerated that in boudoirs there are far more drugs consumed than there are alcoholic beverages in smoking rooms.

The sanitariums are crowded with drug victims. The American, by incessant work, and by the continual strain on the nervous system necessitated thereby, frequently finds himself run down, and suffering from dyspepsia, neuralgia, and various other ills and pains—sure symptoms that the body is rebelling against its abuse. Instead of endeavoring to recuperate by rational and sane methods, the sufferer drugs himself into insensibility with some pet "cure." Apparently he does not understand that pain and lassitude are the red flags hung out by Nature to show that there is danger ahead.

It has long been known to the medical profession that colic cures, children's anodynes, "infants friends," teething concoctions, etc., contain habit-forming drugs, but the majority of mothers have been and still are "ignorant" of this fact! Lest any suspicion or fear should be aroused in the mind of the mother by the fact that the presence of opium, morphin, chloroform, cannabis indica, or some other harmful drug is declared upon the label, the manufacturer or dealer endeavors to allay such fear by statements of the following character: "Contains nothing injurious to the youngest babe." "Mothers need not fear giving this medicine to the youngest babe, as no bad effects come from the continued use of it."

Notwithstanding the fact that these representations have been eliminated or modified so as to comply with the letter of the Pure Food Law, mothers, because of past representations and the fact that the false impressions left by them have not been corrected, believe that these soothing remedies are neither harmful nor habit-forming, and give them with a feeling of security, with the result that in many instances the baby is put to sleep never to awake again. Numerous cases of this character are on record. In some instances in which the remedy is freely used, there is developed a case of infant drug addiction. As soon as the effect of one dose passes away, the child becomes irritable and fretful, with the result that another dose is administered. The craving is met and the child is

quiet, a condition which is similar in every respect to drug addiction among adults.

The chief agents of soothing syrups are well known to be opium, morphin, heroin, codein, chloroform, and chloral hydrate in some combination. A serious element of danger in the use of soothing syrups is the fact that the nurses often use them, unknown to mothers, for putting children to sleep.

The head of a big wholesale drug house in New York testified in court some time ago that samples of a certain catarrh "cure" were being given away in New York City with the object of creating an appetite for them, and thereby increasing their sale at the expense of the moral, mental, and physical health of the community. The vaunted values of patent medicines offered as remedies for asthma, catarrh, coughs, colds, consumption and hay fever depend in nearly every case upon the presence of certain powerful drugs, such agents as cocaine, chlorohydrate, codein, heroin, morphin, opium and nicotine being present.

The medical profession, State boards of health, pharmacy boards and others interested in the public welfare have instigated a vigorous crusade against the indiscriminate sale of cocaine or mixtures containing it, but there are many ways found by the unscrupulous for evading the law. Another difficulty is that street vendors obtain these poisons in various ways and peddle them. The ingenuity and cunning of these peddlers is astonishing. For example, one was discovered carrying about a supply of morphin and cocaine in a book hollowed out for the purpose. The edges of the leaves and one of the covers were glued together, and the body of the pages cut out, thus leaving a book-like box, which was innocent looking and well adapted for the devilish business.

There are on the market to-day over thirty "mail order treatments" for drug victims, whose cunningly worded advertisements have lured fortunes into the pockets of their unscrupulous vendors. It is usually represented by the exploiter of these "treatments" that the habit can be successfully treated at home, by the particular treatment advertised, and its composition is a profound secret, known to him alone. *In most instances they contain the very drug or drugs for which the treatment is advertised and sold.*

BOOK XV

Describes the various schools of medicine and methods of healing. It is divided into eleven chapters, each chapter being as complete as it is possible to make it in a book of this character.

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Book XV

MEDICAL SCHOOLS

PART I.

HOMOEOPATHY

The father of homœopathy, Samuel Christian Friedrich Hahnemann, was born at Meissea, Germany, on the 10th of April, 1755, and died in Paris on the 2d of July, 1843.

In 1790, while engaged in translating into German the Materia Medica of Cullen, a Scotch physician, he was struck with the similarity between the recorded effects of cinchona (Peruvian bark) and some of the symptoms of Fever and Ague. After careful experimentation upon himself and many others through a period of six years, he announced in 1796 as a curative law that medicines act upon the principle of *similia similibus curantur,* or in other words that the symptoms of disease in an individual may be best removed by medicines which cause similar symptoms when administered to healthy persons. It naturally follows that remedies administered upon this principle must be given in small or minute dosage or else the patient's condition would be made worse. Hence the practice of attenuation of remedies by dilution or trituration.

The employment of serums, bacterias and vaccines which at the present time is more or less popular, is also a vindication of homœopathic ciples. Homœopathic physicians are in accord with all that tends to the improvement of the curative art and the prevention of disease. Their broadmindness and cultural requirements are probably best shown by quoting the definition of an homœopathic physician as officially adopted by the American Institute of Homœopathy:

"A homœopathic physician is one who adds to his knowledge of medicine a special knowledge of homœopathic therapeutics. All that pertains to the great field of medical learning is his by tradition, by inheritance, by right."

ADMINISTRATION OF THE MEDICINES AND REPETITION OF DOSES.

Doses for Adults.—The medicines may either be administered dry, by placing them on the tongue, or dissolved in water. In most cases four or five globules should be placed dry on the tongue.

Infant Doses.—For infants one globule will be amply sufficient for a dose. If the tongue is dry add a few drops of water. Even new-born infants are able to swallow that.

Dosage in Solution.—Where repeated doses of the medicine at short intervals are required the appropriate remedies should be administered in solution, in water. Fill a tumbler half full of pure water, put eight or ten globules—or, if a trituration, as much as will lie on the point of a penknife—of the medicine into the water and mix it thoroughly. When thus prepared, a dessertspoonful to adults, or a teaspoonful to children, may be given at a time.

Following Symptoms.—If the patient is worse after the first or second dose the symptoms are either the same, but worse, or there are new symptoms instead of, or in addition to, the former ones. In the latter case give *another* remedy. In the former case when the medicine aggravates the symptoms and makes the patient *temporarily* worse (which is, nevertheless, a good sign) the patient should *cease taking it,* and wait for the effects. Should the aggravation be violent it may be relieved by smelling camphor or sweet spirits of nitre.

Relieving Pain.—It sometimes happens that the most violent pains are increased very much by the smallest dose of the suitable remedy. In such cases give a spoonful of black coffee, and as soon as the aggravation has ceased repeat the remedy. If made worse again repeat the coffee, and so on until the improvement is permanent.

Tincture and Lotion.—With regard to the external application of the tincture of arnica, ruta, and so forth, a lotion of sufficient strength for most purposes may be made by putting five or six drops of the tincture in half a tumbler of water. It may be applied to the injured part three or four times a day, or as often as mentioned under each particular case.

DISEASES AND THEIR HOMŒOPATHIC TREATMENT.

The diseases are given in their aphabetical order, so that they may be referred to quickly.

Homœopathy differs from the other regular schools of medicine merely

in the treatment of the disease, in that it treats the individual patient and not the disease *per se.*

Consequently, as the cause, symptoms and diagnosis of each disease are given elsewhere in the book, in this chapter we will confine ourselves to the homœopathic treatment.

Abscesses.—An acute abscess should not be poulticed with warm bread and milk or linseed poultices, except in extreme cases. It is much better to use nothing but warm or cold water. Hepar or mercurius hasten the suppuration.

If the suppuration should continue for a considerable length of time use silicea. When hard places remain, mercurius will be useful. For hard and swelled glands on the neck and under the chin and ears use mercurius, dulcamara, calcarea carbonica, and so forth.

Anus.—Intolerable itching, rathania; cracked or fissured, graphites; burning, aloe; red or sore, arsenicum; moist and itching, petroleum.

Arms.—Numb feeling, ignatia; covered with purplish spots, pain in axillary gland, kali carb; rheumatic pain in jonts, ledum; elbow or wrist hot and swollen, mercurius; arms and shoulder lame in wet weather, rhus tox.; painful on motion, bryonia; eruptions at bend of elbows, sepia; offensive sweat in arm pits, silicea or sulphur; herpes at elbow, thuja; involuntary jerking, agaricus; wrist as if sprained, bryonia or rhus tox.; cramp and dead feeling, calcarea carb.

Apoplexy.—Bleeding is sometimes practiced. If the pulse is slow and full, face red or purple, give opium; put a few globules of it upon the tongue and use some globules dissolved in a pint of water as an injection. if the pulse is very weak give lachesis in the same way.

If it was preceded by nausea, or if the patient vomits when he recovers, give antimonium tartaricum; if not better in half an hour, use a solution of the same remedy as an injection. Acon., bell., nux vom., etc. may also be required.

Asthma.—Ipecacuanha will be indicated where there is a feeling of constriction about the chest, accompanied by nausea or vomiting.

Arsenicum for the most violent attacks, especially those occurring in consequence of suppressed catarrh, or in persons with weak lungs.

Bryonia or apis are of great benefit, particularly when exercise aggravates the disease, and when it arises from suppressed or tardy eruptions. Bryonia when the paroxysms come on at night and are attended by pain in the bowels. Apis if the neck feels as if it were compressed.

Nux vomica and lachesis are often beneficial when the patient is forced to sit stooping forward.

Belladonna is most suitable when the attacks are made worse by motion.

Arnica is indicated when not only exercise but even speaking or blowing the nose aggravates the symptoms.

Cepa and euphrasia if children awake suddenly in the night with a suffocating cough.

If the chest feels constricted give glonoine.

Cinchona when there is whistling and wheezing in the chest.

Coffea in very sensitive persons who are liable to attacks of asthma in consequence of mental emotions. Aconite, pulsatilla, nux vomica, ignatia, chamomilla, and stapisagria are also given in these cases.

Chamomilla is also serviceable when there is frequent inclnaton to cough.

Rhus when there is very labored breathing.

Sulphur for short, wheezing, obstructed respiration with fear of suffocation.

Bed Sores.—Applications of cold water are often beneficial.

When water alone will not effect a cure, dissolve in it a few drops of arnica tincture.

If there appears to be danger of mortification, give cinchona and wash the spots with the same medicine dissolved in a little water.

Bladder.—See Inflammation of Bladder, Hemorrhage of Bladder.

Bleeding.—See Hemorrhage.

Boils.—Arnica will lessen the pain and inflammation.

Sulphur in cases where there is a frequent return of boils.

Belladonna if it present a fiery-red appearance.

Hepar where the suppuration is too slow and scanty.

Mercurius if the suppuration is profuse and the swelling remains.

Lachesis for very painful boils which become bluish and form rapidly.

Bronchitis.—Aconite when the skin is hot and dry and pulse hard and frequent.

Pulsatilla if there is less heat and more coldness of the hands and feet.

Tartar emetic in all cases when the rattling of phlegm in the chest is remarkable from the first.

Belladonna when there is severe headache, aggravated by coughing, and oppression of the chest.

Lachesis if short, hurried respiration and anxiety with dry, fatiguing cough.

Bryonia if cough is dry, with pain in head and chest.

Phosphorus if the respiration continues oppressed.

Bruises.—Apply to injured parts cloths dipped in cold water, and administer arnica internally.

In very severe cases, followed by fever, give aconite.

A lotion of arnica tincture, in the proportion of half a teaspoonful to a tumbler of water, may also be used.

Should suppuration ensue, hepar must be given.

Burns.—Apply heat, wet or dry. Bicarbonate of soda will remove pain. Soap is a good remedy. Lime water and sweet oil or linseed oil and lime water in equal parts is effective.

Back.—Severe pain as if it would break, belladonna; lumbago, bryonia and rhus tox.; crick or stiffness in the back, rhus tox.; lame back with piles, aesculus hip.; pain in small of back, carbo veg.; pain as from long stooping, pulsatilla.

Blood Poisoning.—Lachesis.

Bones.—Diseased, silicea; syphilitic decay of, aurum; bone pains, eupatorium perf.

Cancer.—Arsenicum; from blow, conium.

Carbuncle.—Arnica given at the very first may lessen the pain. If so, nux vomica will remove the remaining symptoms. Arsenicum as soon as it is spreading. Hepar if the patient is weakened by the copious discharge. Silicea for pain and moderate burning. Lachesis if bluish spots or blue blisters appear.

Catarrh in the Head.—Camphora tincture, in drop doses every half hour for a few hours, may abort the cold. Mercurius is the principle remedy in influenza. Hepar if the symptoms have been better and become worse again. If ineffective, give belladonna. Cepa for ordinary catarrh. Lachesis in catarrhs of the severest kind. Arsenicum when the nose feels stopped up and yet runs. Nux vomica when the above shows no improvement in twelve hours.

Catarrh of the Stomach.—Ipecacuanha should be given first, and then, if necessary, one of the following remedies: Rheum if there is diarrhœa of a thin, slimy character. Veratrum when the symptoms are violent and accompanied by vomiting of bile, and so forth. Capsicum if accompanied by burning in the throat.

Chest.—Stitches, bryonia; tightness, phosphorus, stannum.

Cramps.—Of calves, plumbum; with diarrhœa, veratrum alb.; in fingers, feet, toes, etc., cuprum.

Chicken-pox.—This disease rarely requires medical assistance. When, however, there is a considerable degree of fever, aconitum may be given. When there is much headache, belladonna.

Chills and Fever.—See malaria.

Cholera Inantum.—Antimonium crudum where the tongue is coated white or yellow; dryness of mouth with thirst; nausea with vomiting; offensive, slimy stools and so forth. Arsenicum if the child is very weak, pale and emaciated. Bryonia where the diarrhœa comes on in hot weather. Ipecacuanha if given in the commencement of the disease will often arrest its progress at once.

Cholera Morbus.—Ipecacuanha if the attacks of vomiting predominate. Nux vomica where there is anxiety, pain in the abdomen, tenesmus and so forth. Veratrum should the disease grow worse with cramps, weakness, shriveling, cold, clammy perspiration, and so forth.

Cold.—See Catarrh.

Colic.—Chamomilla is suitable for children, also for grown persons when blue circles appear around the eyes. Nux vomica when there is constipation. Mercurius for violent, twisting colic. Pulsatilla when there is stinging pain in the bowels. Colocynthis is the principle remedy for colic. It is to be given when the pains are very violent, constant, or only cease for a short time, and then recommence with greater violence. Cinchona for flatulency.

Constipation.—Nux vomica in persons of sedentary habit. Bryonia in warm weather. Lachesis when there is a feeling of weight and oppression. Natrum muriaticum in tedious cases.

Consumption.—Treat in the beginning according to the symptoms that arise. (See Cough and Hemorrhage of the Lungs.)

Cough.—When catarrh is accompanied by cough, or when a dry cough remains after the first symptoms have disappeared under the action of other medicines, give nux vomica. If the cough is dry and excites retching or vomiting, ipecacuanha. If it is hollow and causes vomiting, carbo vegetabilis. If accompanied by tough expectoration, chamomilla. If it is moist or loose, ferrum phos or pulsatilla.

Croup.—If children waken suddenly at night and begin with a choking cough, give antimonium tartaricum. Where there is great agitation, give aconite every ten, twenty or thirty minutes, according to the urgency of the case. Spongia is indicated if the voice is rough and the cough hol-

low. Hepar if the voice is only lisping and the cough crowing. Phosphorus and carbo vegetabilis have saved life when all else has failed.

Diarrhœa.—Ipecacuanha in children with screaming, tossing and uneasiness. Chamomilla for children when they want to be carried constantly. Pulsatilla for watery and offensive diarrhœa with burning pain and soreness of the anus. Sulphur for green, slimy diarrhœa. Antimonium crudum for watery diarrhœa with disordered stomach. Rheum for sour, thin, fermented diarrhœa, common with children. Cinchona in all kinds of diarrhœa occurring in debilitated persons.

Diphtheria.—Bryonia when patient is quickly prostrated and complains of pains everywhere. Belladonna when patient is restless and complains of sore throat. Lachesis when, after belladonna, by next evening there is no marked change for the better.

Dropsy.—Dropsy may be due to disease of the heart, lungs, liver, kidneys or peritoneum. The treatment of the various forms is given under the different diseases causing it.

Dysentery.—Mercurius when there is an urgent desire to evacuate. Nux vomica if much straining before and during stool, but relief afterward. Mercurius sublimatis when first much bile is discharged, and then blood or slime. Cinchona for epidemic and periodic dysentery. Veratrum if the discharge is watery, with bloody mucus and flakes swimming in it. Colocynthis for extreme pain in the bowels. Sulphur in all protracted cases.

Dyspepsia.—Nux vomica if caused by dissipation and late hours. Chamomilla when there is a bitter taste in the mouth, bitter eructations, vomiting of mucus or bile. Antimonium crudum when the patient feels sick at the stomach and the tongue is coated or blistered. Bryonia when the stomach is disordered and the patient feels cold and chilly. Ipecacuanha when there is a catarrhal state of the stomach.

Ear.—Oozing raw and sticky behind the ear, graphites; bloody discharge, petroleum; green discharge, mercurius or pulsatilla; growths, polypi in ear, thuja; hearing defective, calcarea carb.; earache, pulsatilla; chronic discharge of blood and matter (ororrhœa), capsicum; redness, burning and itching as if frozen, agaricus; ichorous discharge, arsenicum.

Eczema.—Dry and scurfy even in hot weather, alumina; humid and sticky, graphites; chronic eczema, bran-like, arsenicum; after ointments and external applications have been used unsuccessfully, hepar sulph.;

itching intensely, mezereum; scabby, easily bleeding after vaccination, thuja; burning, sulphur; watery, rhus tox.

Eyes.—Tired from overwork, ruta; corner of lids raw, graphites; twitching of eyelids, agaricus; puffy swelling, apis; inflamed, aconite; hot and burning, belladonna; blinking, watery, red and inflamed, euphrasia.

Face.—Scaly herpes on cheek, anacardium; pimples and pustules, antimonium crud.; puffy and swollen under the eyes, apis; burning pimples, arsenicum; moist, scurfy eruptions, calcarea carb.; eczema, moist around mouth and on chin, graphites; lips cracked and bleeding, ignatial; fiery red eruptions, hypericum; itching tetter around nose and mouth, ledum; raw spots from scratching, mezereum; itching and pimples on forehead, sarsaparilla; yellow tetter around mouth, yellow across nose, sepia; blood boils, silicea; dry itching eruption, staphisagria; "black-heads," sulphur; greasy skin, thuja or natrum mur.; rough skin, acne, berberis.

Felon.—At the beginning, mercurius; follow with arsenicum; to allay the pain, ammonium carb.

Feet.—Itching, ledum; sweating, silicea; stinking feet and arm-pits, sweaty and sore, petroleum; feet waxy and swollen, apis; pain in heel, cyclamen; very painful callosities, lycopodium; bunion, hypericum; frost bitten or feeling as if, agaricus; cramp in, sulphur; fidgety, zincum; sole painful and hard, baryta carb.; cold and damp, calcarea carb.; cracked skin of, hepar sulph.; tender and sweaty, petroleum.

Grippe.—With dry fever, restlessness and racking cough, aconite; sudden onset of the disease with alarming prostration, arsenicum; shivers, prostration, bone pains, aching, eupatorium perf. and gelsemium, alternately; frontal headache, sneezing, fluent coryza, rheumatic pains, limbs heavy, indisposition to move, dry cough, chest painful, bryonia (a good remedy); for lingering effects, chronic grippe, lycopodium.

Tardy Menstruation.—Pulsatilla especially for females of a mild, easy disposition. Cocculus when the patient suffers from nervous symptoms. Belladonna if there is a rush of blood to the head. Apis if flow is irregular. Nux meschata for women with an irregular, scanty, black flow. Phosphorus for women of a delicate constitution. Arsenicum in cases with great weakness.

Suppression of the Menses.—Aconitum when it arises from fright. Bryonia for unmarried women.

Too Copious Menstruation.—Ipecacuanha for too great a flow. Crocus

particularly when the discharge is dark colored. Platina when attended with bearing down pains. Chamomilla with thirst, coldness of the extremities and sometimes fainting. Nux vomica when the menstruation continues too long or returns again.

Painful Menstruation.—Belladonna when there is severe pain in the back with a rush of blood to the head. Chamomilla when the pains resemble labor pains. Coffea for nervous excitement.

Erysipelas.—Aconite in cases with much fever. Belladonna with acute shooting pains, heat and tingling. Rhus if small or large blisters appear. Bryonia when the disease attacks the joints. Arsenicum and sulphur in cases terminating in ulceration.

Fainting.—If it arises from fright, coffea, opium or aconitum. From loss of blood, a few drops of wine and afterward cinchona. When produced by sudden emotions, ignatia or chamomilla. If preceded by nausea, ipecacuanha.

Gout.—Nux vomica for first attack. Aconitum for violent fever. Arnica when the pain in the joints resembles that of a spasm. Pulsatilla when pain flies quickly from one joint to another. Calcarea when the attacks return at every change in the weather. Colocynthis if limbs remain stiff afterward.

Headache.—Glonoine when the attack comes on suddenly. Aconite when the pain is very severe and over the whole head. Belladonna when the pain is deep seated. Pulsatilla when pain is dull and oppressive. Rhus when there is burning, throbbing pain.

Heartburn.—Nux vomica often helps. Cinchona if it comes especially after eating. Carbo vegetabilis if cinchona does not help. Capsicum if none of the above give relief.

Hives.—See Rash.

Inflammation of Bladder.—Aconite for the most common causes when there is painful urging. Pulsatilla if there are pressing, cutting pains. Belladonna if pains are piercing. Colocynthis if the urine becomes sticky and gelatinous.

Inflammation of the Bowels.—Aconite at the commencement. Ipecacuanha when the pains are worse in front. Bryonia when the pain and fever are violent. Chamomilla if the pains are dull.

Jaundice.—Opium, mercurius, cinchona, hepar, sulphur, lachesis and chamomilla have all been used with good results.

Leucorrhea.—Calcarea carbonica when the discharge is milky and often attended by itching. Pulsatilla when the discharge is thick like

cream. Cocculus if the discharge is mixed with blood. Natrum muriaticum when the discharge is copious. Sulphur for inveterate cases when the discharge is yellowish.

Lumbago.—Aconitum if accompanied by much fever. Bryonia when the patient walks in a stooping posture. Nux vomica when the affected part feels as if bruised.

Malaria.—Cinchona as soon as you feel unwell. Ipecacuanha if no better after twelve hours. Arsenicum when the different stages are not distinctly marked. Arnica when the cold stages come on early in the morning. Veratrum when there is external coldness with internal heat. Sambucus when sweating is very profuse. Belladonna and hyoscyamus when two or more attacks occur in the twenty-four hours.

Measles.—Aconite, the chief medicine, is especially indicated when the fever is violent. Pulsatilla and euphrasia when the catarrhal symptoms predominate. Belladonna when the throat becomes sore. Ipecacuanha for arresting vomiting. Bryonia when the eruption is imperfectly developed.

Morning Sickness.—Ipecacuanha, nux moschata, veratrum and phosphorus have all proved beneficial in the nausea and vomiting of pregnancy.

Mumps.—Mercurius is the principal remedy. Belladonna or hyoscyamus if the swelling is very red.

Mind.—Fear, dread, aconite; fixed thoughts, iodium; suicidal thoughts, aurumn; well known things and places seem strange, gloucinum; silent grief, ignatia; hears voices, anacardium; delirium with bright eyes, belladonna; to prevent "stage fright," anacardium.

Mouth.—Sore mouth, borax; parched, bryonia; ulcerated, kali chlorium; teeth loose, gums spongy, mercurius; bitter taste, bryonia, nux vomica; blistered, staphisagria.

Neuralgia.—Aconitum if there is redness and heat of the face. Belladonna if the pain is most violent under the eye. Platina for boring, cramp-like pain. Colocynthis for rending and darting pain. Arnica for heat and throbbing. Bryonia for heat and pressing pain.

Nose-Bleed.—Arnica when caused by a blow, fall and so forth. Pulsatilla for women. Aconite for plethoric individuals. Carbo vegetabilis when nose bleeds frequently and from slight causes. Rhus when brought on by great exertion.

Neurasthenia.—Nervousness following fever, ambra; coldness of back and shoulders, ammonium mur.; sensation as if one could not breathe, asafoetida; great exhaustion in the morning, calcarea carb.; weakness,

antimonium crud.; acrid discharge, arsenicum; ulcerated, fœtid, aurum;

Nose.—Red, pointed, cracked, alumina; sore, cracked, crusty nostrils, in farm room, pulsatilla; swollen and painful chronic inflammation, phosphorus; dirty, bloody, fœtid, nitric acid; red, swollen, shining, painful to touch, mercurius.

Palpitation of the Heart.—Aconite, chamomilla, veratrum, coffea and opium, when caused by mental emotions. Nux moschata when accompanied by fainting. Cinchona for persons with a sour stomach.

Pain.—Bruised like, arnica; bones ache, eupatorium perf.; burning, arsenicum; slowly increase and decrease, stannum; periodical, shifting, wandering, pulsatilla; worse by motion, bryonia; must move for relief, rhus tox.

Palsy.—Wasting palsy, plumbum; argentum nit.; shaking palsy, tartanula hisp.

Piles.—Aconite when blood is discharged. Nux vomica when there is a burning, pricking pain. Apis for small stinging, biting tumors. Capsicum when the tumors are much swollen. Ignatio for violent stitches which penetrate deeply. Chamomilla, when the blood flows freely.

Pleurisy.—Aconite is the chief remedy. Bryonia for acute, shooting pains in the chest.

Pneumonia.—Aconite in the beginning. Bryonia for cough with rusty-colored sputum. Mercurius for profuse sweats. Antimonium tartaricum when there is oppression of the chest. Sulphur for frequent, weak faint spells, and so forth. Arsenicum when there is great prostration with anxious restlessness.

Quinsy.—Hepar in the beginning. Mercurius when the tongue is furred and flabby. Lachesis when there are white or gray patches on the throat.

Rheumatism.—Aconite if there is high fever, dry, hot skin, thirst and redness of the cheeks. Belladonna when the pain is chiefly in the joints. Mercurius and pulsatilla when the pains are worse at night. Rhus for red and shining swelling of the joints. Cinchona for pains which are aggravated by the slightest touch. Aconite, bryonia, calcarea carbonica, dulcamara, mercurius or sulphur, in chronic rheumatism for pains which are excited or made worse by the slightest chill. Calcarea carbonic, dulcamara, rhus toxicodendron and hepar sulphuris in chronic rheumatism when the attacks are assisted by bad weather.

Scarlet Fever.—Aconite at the beginning. Belladonna and mercurius in the simple forms when the eruption is bright red. Bryonia when the

eruption does not come out well. Pulsatilla for great restlessness. Lachesis and lycopodium, when the eruption is dark in color and scanty. Arsenicum when the ulcers in the throat turn livid about the edges and emit an offensive odor.

Sleeplessness.—Coffea, opium, aconitum and ignatia when due to exciting events. Pulsatilla when due to excess of coffee and tea. Chamomilla when due to complaints of the bowels.

Small-Pox.—Aconitum if there are congestions to the head and lungs. Belladonna if there is delirium with headache. Bryonia if the eruption is delayed. Variolinum is the most important remedy.

Sore Nipples.—Tincture of arnica previous to confinement will prevent them. Arnica internally and bathing the nipples with a solution of ten drops of tincture of arnica to a half tumbler of water several times a day.

Sore Throat.—Aconite for difficulty and pain in swallowing and speaking. Ignatia, nux vomica and pulsatilla when there is a constant feeling as if there were a lump in the throat. Bryonia, rhus and capsicum when the throat is painful on being touched. Sulphur for frequent or constant sore throat.

Spasms.—Chamomilla if there is convulsive jerking of the limbs, and so forth, followed by drowsiness. Belladonna when the child starts suddenly from sleep with pupils dilated, and so forth. Ignatia when the cause is unknown. Coffea in weak and nervous children. Ipecacuanha in asthmatic children.

Typhoid Fever.—Baptisia, bryonia, rhus tox., phosphoric acid, arsenicum and hyoscyamus are chiefly used.

Toothache.—If in decayed tooth, mercurius; in sound teeth, spigelia; intense throbbing and redness, belladonna; when relieved by cold water, coffea; in recently filled teeth, arnica.

Ulcers.—Arsenicum when they burn greatly. Carbo vegetabilis when they smell offensively. Lachesis when they spread.

Urinary Difficulties.—Pulsatilla, belladonna, cinchona, silicea or stramonium in inability to retain urine during pregnancy. Aconite, pulsatilla, arnica, nux vomica, belladonna, mercurius, hepar, colocynthis, apis, cepa and opium for difficulty and pain in making water.

Vertigo.—Aconite, when nausea, eruptions and vomiting are present. Pulsatilla or antimonium crudum, if there be a disordered stomach. Nux vomica, chamomilla, pulsatilla, rhus or coculus if it occurs while eating or after a hearty meal.

Varicose Veins.—Hamamelis, internally and externally; tending to ulcerous condition, carbo veg.

Whooping Cough.—Aconite at the commencement. Dulcamara if brought on by a severe cold. Pulsatilla for loose cough with vomiting. Nux vomica, belladonna and hepar when the cough is dry. Ipecacuanha, veratrum, carbo vegetabilis, cina, caprum, metallicum and arnica give good results.

Warts.—Warty, fungous excrescences, fig warts and polypi, thuja; warts on nose and eyebrows, etc., causticum; in pale, nervous unhealthy persons, staphisagria; in great crops of warts on hands, ferrum picricum.

Women.—Delayed menses, pain in back, pulsatilla; with yellow color of skin, etc., sepia; with cramps, cuprum; with fever, belladonna. Painful with headache and chilliness, calcarea carb.; with nervous excitement, coffea; writhing pain, nux vomica; sour stomach, heaviness, wants open air, pulsatilla; too soon, every two weeks, hysterical, ignatia; headache, shivering, calcarea; irregular, pulsatilla; with sick headache, sulphur; too scant, pulsatilla; yellow color of skin, excoriating, sepia; chilly, milky discharge, calcarea carb.; vertigo, throbbing headache, belladonna; from stooping, staggering blindness, numbness, headache every other day or one-sided, pulsatilla; bitter taste, bilious, nux vomica.

Worms.—Ipecacuanha, carbo vegetabilis, pulsatilla, cinchona and nux vomica are useful remedies. Aconitum, cina, mercurius, belladonna and lachesis for colic caused by worms. Sulphus and calcarea for tape worms.

MEDICAL SCHOOLS

PART II.

OSTEOPATHY

In a consideration of this subject it is well to have in mind that it is not something which may be practiced off hand after cursory study, even though the works studied be the best extant. No layman of intelligence, no matter how much he might have read about surgery, would attempt to cut off a man's leg except under the most dire circumstances and the securing of a surgeon were impossible. Surgery requires years of study and years of practice to make proficient, and in osteopathics years of study and practice are quite as essential in so far as the obtaining of results is concerned. So thoroughly is this fact now recognized that already in a large and growing number of states the professional practice of osteopathy is by law restricted to those who have taken a regular collegiate osteopathic course and received their degree of Doctor of Osteopathy (D. O.). Taking the Philadelphia College of Osteopathy (governed by the laws of the State of Pennsylvania) as an instance, the course is four years, the matriculation and first two years of the course being practically indentical with that of the medical profession, the last two years, however, materially differing in that while the medical student largely devotes his time to the study of medicines and their effects, the time of the osteopathic student is most chiefly given to the study of higher anatomy and physiology, the nerve centers and their branches, the nervous cells themselves, the muscles and fibres and the minutest co-relationship of all of them with the spinal cord and vertebra, in dissection of the human cadaver with relation to these matters and in practical work on the living body with the object of being able to recognize normal and abnormal conditions by a feeling with the hands.

The high place and professional standing of the properly licensed osteopathic physician is thoroughly recognized by the medical profession and it is of daily occurrence for the most eminent physicians and surgeons to refer their patients to osteopaths of proper qualifications. But, as in the medical profession there are "quacks," so in osteopathy there are those who are not professionally qualified and when such men undertake the curing of all diseases and declare that osteopathy is the alpha and omega in the treatment of all disease, they not only do detriment to the science of osteopathy, but they become a menace to society.

It will be apparent from the foregoing that no mere chapter, such as the present, can furnish sufficient information to enable the reader, without further study, to proficiently undertake the exercise of osteopathic practice, even in its simpler forms. It is intended to outline here simply the salient features. To do more would require a large volume devoted exclusively to the subject, after the study of which much practice in actual manipulation would be essential.

The science of osteopathy was discovered by Dr. A. T. Still, of Kirksville, Mo., and was first propounded in 1874. There have been innumerable definitions of osteopathy, but it may be briefly referred to as the science and art of curing without the use of knife or drugs. One of the best descriptions given has been that of J. Martin Littlejohn, M. D., D. O., Ph. D., LL. D., F. S.S.C., F. R. S. L., etc., in an address before the Royal Society of Literature, London. Dr. Littlejohn said:

"Osteopathy is based on an accurate knowledge of the anatomical structure and physiological functions of the body organism. Nature has placed within the body certain vital forces, vitalized fluids, and vitalizing processes and activities, which, in harmonious accord with one another, maintain the equilibrium of the body mechanism; any disturbance of these forces, fluids or processes and any interference with their activity, circulation or distribution involves the absence of harmony and interference with the body order. Osteopathic manipulation aims to restore these to their normal condition, so that the body may regain its normal functional equilibrium and form. In this way osteopathy claims that life is revitalized and strengthened by vital forces, vitalizing fluids or processes, disease being removed or overborne by getting rid of an abnormal structural alignment that produces disharmony in the body and prevents normal functional activity."

Before taking up the subject of Osteopathy in detail it may be well

to define certain words which will be used in this article and which, except professionally, are not in common use:

Atlas—The first vertebra of the neck, articulating immediately with the skull, thus sustaining the globe of the head, whence the name.

Ganglia—Plural of ganglion.

Ganglion (*pl. ganglia*)—(a) A mass or knot of nervous matter, including nerve cells, usually forming an enlargement in the course of a nerve; (b) a node or gland in the lymphatic system, as a lymphatic ganglion.

Pia Mater—The delicate and highly vascular membrane immediately investing the brain and spinal cord.

Plexus (*pl. plexuses*)—A network of vessels, nerves or fibers forming a distributing center.

Pneumogastric—Of or pertaining to the lungs and the stomach and here used as respects the pneumogastric nerve.

Splanchnic—Of or pertaining to the viscera; visceral.

Subluxation—This word belongs peculiarly to osteopathy and chiropractic and is seldom used in other systems of therapeutics. "Luxation" means a dislocation and consequently subluxation means a partial or minor dislocation.

Viscera—Plural of viscus.

Viscus—One of the great organs, as the brain, heart or stomach, in the great cavities of the body—especially used in the plural (*viscera*) and applied to the organs contained in the abdomen.

Vasomotor Center—The chief dominating or general center which supplies all the unstriped muscles of the arterial system with motor nerves, situated in a part of the medulla oblongata (posterior part of brain connected with the spinal cord); a center of reflex action by the working of which afferent impulses are changed into efferent—vasomotor impulses leading either to dilation or constriction of the blood vessels.

We shall now briefly consider the requirements of and the claims for osteopathy:

Requirements of Osteopathy.—Osteopathy demands an exact and most thorough knowledge of the anatomy or structure of the human body. It requires an intimate acquaintance with the physiology and functions of the various tissues, fluids and organs. Add to this a comprehensive study of psychology or the workings of the mind. It also includes a knowledge of the chemistry and physics of the human mechanism.

Nature Herself Can Cure.—By study and experiments, osteopathy

claims to have discovered certain laws of nature and methods of cure within the body itself. By the application of these methods, according to osteopathic practice, nature, herself, may remove the disease and cause the body to again regain its health and strength. This occurs not from any stimulation caused by drugs, but in accordance with certain mechanical principles residing in the body itself.

The Body a Machine.—Osteopathy regards the body as a wonderful mechanism, and treats it as an intelligent machinist would treat a complicated machine with which he was perfectly familiar.

The Human System Perfect.—The human system is regarded as being perfect. Man is believed to have been created complete, having within himself the power to regain health and vigor. Were such not the case, it is argued, the human body would be incomplete, and man would have to look outside for the relief of disease.

By an exhaustive study of the anatomy or structure, and the physiology or functions of this human body, it is observed that man is a complete being, capable of performing his own physical and mental acts when in health.

Disease is regarded as simply disorder. To restore health, the disordered parts must be corrected.

Drugs Harmful.—Osteopathy believes the giving of drugs for the cure of human ills to be both unreliable and unscientific. It absolutely denies the curative properties of drugs. It so regards the whole system of drug treatment as unnatural and destructive to health.

Disease Not an Entity.—The osteopath does not look upon disease as a definite enemy which must be attacked by some foreign force. Disease is regarded as a disorder of the normal structure of a part, causing some disorder of the normal function of the body.

The Human Body a Perfect Machine.—The human body is looked upon as a perfect machine. Order is considered the first law of health. If in order, the human machine will do its work properly and run its allotted time.

What Osteopathy Does.—Osteopathy endeavors to discover and correct all mechanical disorders in the human machine, and to direct the recuperative power of nature within the body to the cure of disease. It claims that if there is an unobstructed nerve and blood supply to and from all parts of the well-fed man, the effects called disease will surely disappear.

Treatment.—The treatment is by manipulation. According to Dr. A. T. Still, exciting the nerves causes muscles to contract and compress

venous flow of blood to the heart. The bones can be used as levers to relieve pressure on nerves, veins and arteries. Treatment is chiefly by manipulations of the spinal column and adjustments of subluxated vertebra.

Object of Osteopathy.—The object of osteopathy is to permit a perfect freedom of all fluids, forces and substances pertaining to life. It endeavors to restore the harmonious action of all the parts, which must ensue when they are unirritated by any cause. It aims to maintain the complete circuit of the motor, sensory and sympathetic nerves.

Cause of Disease.—The cause of the disease, according to osteopathy, may be dislocated or subdislocated bone, ligament, cartilage or muscle, causing inhibition or irritation of a nerve fiber or an obstruction of an artery, vein, lymphatic or some fluid of the body to which the affected nerve or vessel is distributed or connected.

These osteopathic disorders are not necessarily surgical dislocations, but are parts out of line, out of proper adjustment. They comprise slight displacements of various structures, chiefly bones and ligaments, with muscular contractions, little adhesions, contractions from cold, irritation or other outside influences, causing unnatural pressure upon vessels or nerves.

Osteopathic Examination.—The patient is examined from the physical standpoint. In the eyes of the osteopath he is a machine out of order. By his knowledge of the details of the human machine, when in health, the osteopath feels able to detect the disorders that are present in disease.

Through a highly developed sense of touch and a knowledge of anatomy, the osteopath claims to be able to discover the slightest anatomical disorder. The conditions present and the symptoms shown are used as clues to find the cause of the disease. By means of these signs and symptoms the nerve supply of the diseased part is traced to its origin and the course of the blood channels is followed from the parts diseased to the exact region where the abnormal condition is caused. When the primary lesion, or the point where the disease is caused, is located, treatment begins.

Dr. Littlejohn is authority for the following:

Diagnosis.—"Osteopathic diagnosis is reduced to the discovery or attempted discovery of the cause or causes of a disease. Conditions may be summarized under the heads:

"(1) Misplacements of bone, cartilage, ligament, muscles, membrane or organs of the body;

"(2) Disturbances in the fluids of the organism, including the blood, the lymph and other secretions of the body; and

"(3) Disorders or derangements by tension, impingement, thickening, induration, and so forth, of the nervous system, including its centers, ganglia, plexuses and fibres.

Therapeutics.—"Following up this line of physiological thought, the osteopathic therapeutics is simplified and will consist of the correction or the removal of the cause or causes of disease.

"Corresponding with the diagnostic points, we find:

"(1) Scientific manipulations that aim to correct displacements in the bony and other tissue structures of the body, in its membranes or organs;

"(2) Scientific manipulations that are designed to rectify the disturbances in the circulation of the body fluids and to restore them to their normal condition, especially blood conditions and defects in the blood circulation and distribution; and

"(3) Scientific manipulations that utilize the nervous system with its fibers, ganglia and centers with the view of correcting the nervous disorders, toning up the general system or its local parts, promoting trophic conditions of the nerves and muscles and stimulating a normal correlation of the physic with physiological and vegetative functions of the human system.

The Essential Principles of Osteopathy.—"The essential principles of osteopathy may be set down thus:

"(1) Health is natural; disease and death between the time of birth and old age is unnatural;

"(2) All bodily disorders are the result of mechanical obstruction to free circulation of the vital fluids and forces, and the continuity of nerve forces.

"(3) The impediments in the way of free fluid circulation and uninterrupted nerve force are found in osseous displacements, contracted muscles, ruptured ligaments, constricted or dilated vessels, hypertrophied tissue substance or congested conditions of the tissues.

"(4) These abnormal conditions represent not only the change in structure or function on the part of particular portions of the organism, but also produce physiological disorganization of the vital forces of the body, producing an irritable condition either of overstimulation or in-

hibition resulting in excessive activity, partial activity or inactivity of the vital forces and processes.

"(5) In the restoration to the normal the main purpose in operative manipulation is to co-ordinate the vital forces, to restore harmony in the vital functions and thus aid nature in the elimination and checking of disease conditions."

The Nervous System.—The nervous system occupies a very important place in the study and practice of osteopathy. For convenience of reference it is commonly divided into the cerebro-spinal nervous system and the sympathetic nervous system, but in fact they are parts of one whole, each cell only being capable of perfect life so long as it is able to reciprocally communicate with all other cells through the central nervous system, all thus connecting with the spinal cord in the vertebral column. A thorough study of the chapter on Anatomy and Physiology will show the relationship of the nervous system to the whole body, but in respect of osteopathy it is necesary to delve still deeper and understand the working of every nerve cell. In the so-called sympathetic system, especial attention is drawn to the *ganglia,* the *plexuses* and the *communicating fibers.* The lateral chains of ganglia are placed one on each side of the vertebral column and are connected with the cerebro-spinal nerves by well-marked cords. The visceral ganglia are found between the coats of viscera and are known as the peripheral apparatus. The principal plexuses are four in number, but there are many branches or subsidiary plexuses. The first of the four, the pharyngeal, is situated around the larynx and pharynx; the second, or cardio-pulmonary, lies in the thorax; the third, or solar plexus, encircles the coeliac axis and superior mesenteric artery; and the fourth is the pelvic plexus, which governs the generative organs and rectum. The ganglia and plexuses are all intimately connected with each other by numerous nerve fibers, and the whole constitutes the sympathetic nervous system. "The function of the sympathetic system is to control the calibre of blood vessels, the plain muscle fibers and the actions of the secretory and excretory glands." (Tasker.) "In general it may be said that the sympathetic presides over involuntary movements, nutrition and secretion, holds an important influence over temperature and vaso-motor action, and is endowed with a dull sensibility." (Robinson's *Abdominal Brain.*) It has been scientifically demonstrated that the sympathetic system may in a certain sense have an independent action, "but it is to be borne in mind that under normal conditions the cerebro-spinal nerves can influence these activities, either repressing or augmenting them.

The ganglia of the sympathetic contain (a) nerve cells, (b) afferent fibers, (c) efferent fibers,—and are, therefore, governing centers. They are able to reecive sensation and transform this into motor impulses, and hence are, in a measure, independent. The cervical portion of the gangliated cord contains three ganglia, which are designated as superior, middle and inferior, according to position. These ganglia are important to the osteopath because they are in a measure affected by direct manipulation, *i. e.,* pressure can be transmitted to them through the soft tissues over them." (Tasker.)

The plexuses are of such importance in osteopathic practice that they deserve especial mention, particularly the cardiac, the pulmonary and the solar:

(a). **The Cardiac Plexus.**—This consists of a superficial and a deep division, and is situated at the base of the heart and in the concavity of the arch of the aorta. It is formed by fibers from the pneumogastric and cervical cardiac sympathetics; also cardiac branches from the second, third and fourth dorsal segments of the spinal cord. The cardiac nerves form the cervical sympathetic chain all entering the cardiac plexus, but with variable distribution. The superficial cardiac plexus receives the "left superior cardiac nerve of the sympathetic and the left inferior cervical cardiac branch of the pneumogastric." (Morris' Anatomy.) The deep cardiac plexus receives all the other cardiac nerves.

(b). **Pulmonary Plexus.**—"The anterior pulmonary plexus is formed by a branch of the pneumogastric and the sympathetic. Its branches enter the lung on the posterior aspect of the bronchus." (Tasker.)

(c). **Solar Plexus** (Sometimes called the Abdominal Brain).—"The coeliac or solar plexus supplies the viscera in the abdominal cavity. It consists of a great network of nerves and ganglia, situated behind the pancreas and the lesser peritoneal cavity and in front of the aorta and crura of the diaphragm. It surrounds the coeliac axis and root of the superior mesenteric artery, extending downward as low as the pancreas and outward to the suprarenal glands. This plexus and the ganglia connected with it, receive the great, the small and the least planchnic nerves of both sides, and some filaments from the right vagus (pneumogastric) nerve. It distributes filaments which accompany, under the names of plexuses, all the branches from the front of the abdominal aorta." (*Gray's Anatomy.*) The branches of the abdominal aorta, as subsidiary plexuses, take their names from the arteries they accompany—as, the *phrenic* or *diaphragmatic plexus;* the *suprarenal;* the *renal;* the *sper-*

matic and *ovarian;* the *gastric;* the *splenic;* the *hepatic;* the *superior mesenteric;* the *aortic;* the ultimate distribution of the branches being to the muscular and secretory tissues of all the abdominal viscera, and to the muscular coat of the arteries supplying these viscera. The solar plexus is the greatest of all the plexuses. "It is connected with almost every organ in the body, with supremacy over visceral circulation, with a control over visceral secretion and nutrition, with a reflex influence over the heart that often leads to fainting and may even lead to fatality." (Byron Robinson's *Abdominal Brain.*)

The Vertebral or Spinal Column.—It is held by osteopaths that through the general nervous system and its accessories the spinal vertebra is in direct relation with all parts of the body and that if the anatomy of the body be thoroughly understood and there be full knowledge of all the nerves, nerve cells, muscles, cords, etc., and their accessories, as also of the nature of their respective reflex actions, disease in any and all parts of the body may in most cases be checked and cured by a proper manipulation of the vertebra, arteries, nerves and muscles; or in some cases of other points, such as the shoulder, etc., but primarily the vertebra, for it is a fundamental principle of osteopathy that a perfect adjustment of the spinal vertebra is essential to healthy organism and therefore not only is special study given to the vertebra, the spinal cord and the nerves emanating therefrom, but in treatment of all disease especial care is given to manipulation of the spine and to perfect adjustment of the subluxated vertebra.

Many authenticated instances are given in osteopathic works of effects produced on different organs by manipulation of certain parts of the vertebra. Referring to some of these cases, J. Deason, Sc. B., M. S., Ph. G., D. O., Director of the A. T. Still Research Institute, says: "The secretions of the kidneys can be increased from 25 to 100 per cent. by stimulatory treatment applied to the eleventh and twelfth thoracic segments of the spine. The secretion thus produced often remains increased for two or three hours or longer, during which time the water content of the body is greatly reduced. The significance of such treatment is apparent. If the toxin content of the blood can be materially reduced, as experimental evidence shows it can be, this is a very efficient method in infectious fevers."

Subluxations.—A subluxation may be very slight, yet be the cause of serious physical disorders, directly, indirectly or reflexively. Dain L. Tasker, D. O., D. Sc. O., Professor of Theory and Practice in the Pacific

School of Osteopathy, says: "In order to get at a true understanding of what subluxation is we must make a careful study of the structures which form a point and their vital manifestations. The bones of the skeleton are bound together by ligaments and muscles. The opposing surfaces of bones forming movable joints are covered with cartilage. The muscles execute and the ligaments or soft parts around a point limit the motions of the articulation. All movable articulations have their bony parts maintained in their normal relations either by the form of the bones and cartilages attached to them or by the equal tension of all the controlling muscles. Enarthrodial joints (*i. e.,* ball and socket joints) have freest movements and yet are the least dependent on muscles for retention of their normal position. Air pressure and the form of the bones are responsible for the integrity of these joints. These joints are less frequently subluxated than those possessing more limited motion. Arthrodial joints (*i. e.,* semi-flat or qualified ball and socket joints) depend upon the equal tension of their governing muscles to keep the opposed surfaces in their proper relations. Co-ordination of the muscular tension is usually so perfect that the joint surfaces are perfectly opposed to each other. The disturbance of this nicely balanced muscular tension results in the drawing of one or both bony surfaces away from their true relations; not entirely but sufficiently to make it possible for the physician's fingers to note the change." Dr. Tasker then refers to subluxations of the atlas, or first vertebra, and continues: "The complete dislocation of this bone from the occiput means death; intermediate positions, subluxations, mean both irritation of nerves direct, and both direct and indirect disturbances of circulation; direct disturbance by pressure exerted on arteries and veins, indirect disturbance by excitation of vaso-motor nerves."

PRACTICAL OSTEOPATHY.

In etiology, symptoms and prognosis osteopathy does not materially differ from the other schools. It is in diagnosis and treatment that osteopathy stands alone.

Osteopathic Treatment.—The mode of treatment is a scientific manipulation by which the dislocation is reduced. The manipulation is based on the physical laws governing the actions of the human machine.

The osteopath not only applies the mechanical principle which is indicated in each separate case, but adopts other scientific agencies. Every move made by him in treatment is with the definite purpose of correcting the anatomical disorders.

MEDICAL SCHOOLS

PART III.

MASSAGE AS A TREATMENT OF DISEASE.

General Description.—Massage is a method of treating abnormal conditions by various manipulations whereby the muscles, nerves and blood-vessels are treated by scientific rubbing, rolling, kneading, moulding, thumping, squeezing, pinching, slapping, etc., the blood thereby being hastened along its course.

The treatment has been abused by many unscrupulous impostors, and in consequence there is a prejudice against massage with many people. Of its therapeutic value, when judiciously used, there can, however, be no doubt, but it is unwise as a rule to use massage without the advice of the family physician. Massage is not applicable in pregnancy, it is not permissible where there is a collection of pus, in acute inflammations of the joints, inflamed veins, fragile arteries, wounds of the skin, nor, generally, may it be used in those conditions in which it is not desirable to increase the circulation or where for any reason the patient cannot bear handling. In cases such as we have cited, it may have injurious and even dangerous effects. In short, while massage, if properly applied, is of undoubted value in the treating of certain ills, nevertheless it must not be used haphazardly.

In respect of such ills as massage is applicable to, the effect of the manipulations is to promote nutrition, either general or local, to relieve congestion, to aid in the removal of waste products, and in the absorption of effusions and abnormal deposits. In the main, the influence is felt in the cutaneous, muscular and nervous structures, upon the digestive and the nutritive functions, and upon certain of the internal organs.

By alternate contraction and relaxation, the muscles are exercised as fully as possible without exhaustion, and the blood is propelled with greater activity, thus permitting its life-giving qualities to reanimate and restore vitiated and worn-out tissues.

Respiration and secretion are likewise increased and proper action

of the intestines promoted. By reflex action on the nerves of sensation, massage frequently gives relief from pain. A rise of temperature usually accompanies a treatment by general massage, and where confined to a limited area, a local rise of a number of degrees may occur.

Methods of Massage.—Any knowledge of the technical details of massage which can be obtained from text-books or lectures is at best but superficial and theoretical, for the manual dexterity essential for the proper application of massage requires long and continued practice on the human body, and its intelligent execution also requires a proper knowledge of anatomy and physiology.

There are a number of methods of giving massage, but those generally in use may be classified as coming under the Swedish, German or French systems. The Swedish is vigorous, bracing and literally followed is only applicable to strong, muscular, hardy people. It exercises the muscles to the bone, and is supposed to give the same benefit at each treatment as would a walk of several miles, yet without producing like fatigue. The German treatment is really a modification of the Swedish system, some of the exercises being omitted and substituted by baths. The treatment is much more gentle than the Swedish and is suitable for most patients unless they have been reduced to a weakened condition by long illness. The French system is merely a delicate manipulation, chiefly used by French ladies in what is sometimes called "Beauty Culture," being designed to keep the skin free from wrinkles and blemishes. The French treatment as a rule is confined to the face, neck, arms and hands. It undoubtedly advantageously develops the parts treated and enables ladies who systematically make use of it to retain their beauty to an age that will rarely happen without. French massage is not of any special value in the treatment of disease but it sometimes is of benefit to invalids by giving them a refreshed feeling from the manipulation of the skin.

There can be no question as to the need of having some regular system—that is to say, in treating any one patient there should be some regular system followed out in the same way on each occasion when treatment is given. Just which system to use must depend upon the condition of the patient. It would be absurd to give the strong, vigorous Swedish treatment to one convalescing from a long illness. The full Swedish treatment even to the ordinary well man would be apt to bruise his muscles and therefore do more harm than good, yet to a football player or other athlete whose muscles were strong and hard the Swedish treatment would be of value. Common sense and consideration of the condi-

tion of the patient must be factors in deciding what to do in each case. With those who are weak or delicate the treatment must at first be very light from day to day, as the muscles become accustomed to the treatment, the pressure may be increased and more force used in manipulation.

Manipulation.—The room in which massage is given should be warm and free from draughts and care should be taken that the patient is really in condition to receive treatment. For instance, it is usually dangerous to give general massage in typhoid fever, owing to the tender condition of the bowels, and in cases of weak heart the increase in circulation from a vigorous massage might prove disastrous. Do not massage a moist skin. If the patient has been perspiring, first give a cooling sponge bath of alcohol or alcohol and water. Each part of the body before and during massage should be rubbed over with olive oil, vaseline, or cocoa butter. If there be a heavy growth of hair it may be advisable to shave, as otherwise manipulation may give pain and irritation of hair follicles, resulting in abscesses. If for any reason it is undesirable to shave, then extra precaution must be taken in connection with each and every treatment that irritation is not caused at the hair roots. Do not rub such parts in the opposite direction from which the hair grows. In giving massage over the breasts or navel use a circular motion from left to right. There need be no fear of getting too near the bone in massaging deep muscles, yet be very careful that the manipulations over the bowels and vital organs are not excessive. There is an erroneous idea with many people that the patient should always be rubbed toward the end of the fingers and toes. On the contrary the rubbing should be toward the patient's heart, because the veins which carry the impure blood back to the heart and lungs to be freed from impurities lie near the surface, and by rubbing toward the heart the desired return of the poisoned blood is accelerated.

The patient should be placed on a raised couch or table, narrow enough to permit of manipulation from either side. The patient should lie flat on the back with all muscles relaxed. The patient should draw his knees up when the abdomen is being treated, as this relaxes the abdominal muscles. After treating all parts of the front of the body, the patient should lie with the face downward and the muscles of the back receive their treatment.

Begin with the head and using the finger-tips rub the scalp in a brisk, energetic manner, so as to induce circulation. The face should be massaged with a rotary motion, commencing with the chin and working upward toward the ears until a healthy glow is obtained. The neck should

then be treated in the same manner. The arms are next in order. Commence at the tips of the fingers and make a few strokes upward to the shoulder in order to start circulation. This also prevents chilliness and should be followed in respect of each part of the body as it may be exposed. Now commence the regular massage of the hands and arms, starting with the tips of the fingers and rubbing each finger joint separately with a circular movement. Work in the direction of the palm, following the palmar bones to the wrist, carefully manipulating each joint. It is at the wrist that the real work of massaging the long muscles begins. Grasp the arm with the two hands and manipulate the thumb sides away from each other, as if dividing or parting the muscles from the bone. This should be carried out through the entire length of the arm. This same parting manipulation applies also in the treatment of the legs and all parts where there are long muscles.

The next movement is that of wringing or twisting the muscles more or less in the same way that one might wring a wet cloth. The effect of this is to drive the blood from the muscles and stimulate the nerve centers. The next manipulation is that of kneading the muscles. Place one hand on the under side and one on top, and grasping with a firm grip of the hands use the balls of the thumbs to roll the muscles with a slow rotary motion from left to right. This manipulation should be repeated in respect of each and every muscle. Now go back to the tips of the fingers and commence a series of squeezes, working on each muscle with quick, firm grasps. This has a tendency to accelerate the flow of blood to the heart. The elbow joint should be given very careful attention and every spot thoroughly exercised. Now whip or flay the arms with finger-tips, using a light staccato stroke, which is best obtained by shaking the hands from the wrist. Before treating the larger muscles in this way they should be pounded with the sides of the open hands, the fingers extended. The motion is just as if one were chopping or hacking. The same procedure is carried out with the shoulder and hip joints, care being taken to work in as deeply as possible.

To massage the chest, the hands are laid flat, greater weight being placed on the thumb sides. Manipulation should be rotary from left to right. Little or no pressure should be given over the nipples. Now, using the thumbs and index fingers, grasp the flesh near the short ribs and by rolling motion work the muscles upward. Do this several times.

Work That is Necessary in Treatment of the Abdomen.—The patient having drawn the knees up to relax the muscles, the hands should be

placed flat on the bowels near the hips, and using wrist force, the hands rolled firmly but gently forward to the tips of the fingers. In doing this use a rotary motion from left to right. Thorough manipulation should be given over the liver and if properly treated great benefit frequently ensues in cases of torpid liver, constipation and similar troubles, but in treating the abdomen it is better to err on the side of gentle manipulation than to run any risk of doing injury by severe work.

The legs are treated in the same manner as the arms, but because of deeper muscles, extra force is necessary. Each movement should be gone over several times when treating the legs and the large, deep muscles will stand thumping, hacking and slapping with the open hand to an extent that is not possible with the arms.

The patient should now turn on the face and the back of the body and the limbs treated in a similar manner to that just described. Commence with the back of the head and neck. Massage the base of the brain and all down the spinal column very thoroughly, the idea being to stimulate the nerve centers which are located here. The treatment of the back generally is the same as that of the chest. The spine should be flayed until it has a reddish glow, but do not use undue force.

In general massage the extremities should be treated first, the motion always being in the direction of the long axis of the bone and extending from the ends toward the body or trunk. After general massage has been given as above described, it will usually be found beneficial to use a few simple movements such as the following:

Commence with the hands. Rotate each finger from right to left four times, then the same number of times in the opposite direction. The wrist should be treated in the same way. Then raise and straighten the forearm, having the patient use slight resistance. Then grasp the wrist and elbow and extend the arm to its full length, and then move it in a large circle—four times one way and four times in the opposite direction. Treat the feet and legs in a similar manner. These movements are refreshing to the patient after the somewhat fatiguing manipulations of the general massage.

The duration of a single treatment should be from forty to sixty minutes for general massage. Local treatment of course takes less time. The main movements employed, as will be seen, are stroking, pounding, kneading and percussion. The tips of the fingers and the balls of the thumbs are principally, though not exclusively employed, and the action

is a free one from the wrist. After treatment a period of rest of at least an hour should be observed.

It is sometimes asked whether massage may not be given through thin clothing without exposing the body. Such treatment is of course possible, but to gain the full benefit of manipulation it is essential to work directly upon the body.

Local massage is found very beneficial in many ills, and is recommended for congestion of the liver, gall stones, neuralgia, headache, nervous prostration, paralytic affection, St. Vitus' dance, writer's cramp, muscular rheumatism, stiff joints, sprains, curvature of the spine, obesity and various other troubles.

While massage is recommended for sprains, it is necessary to make sure that there has been no fracture. Having ascertained that there has been no fracture and that the bones are all in proper place, massage treatment may be used. Raise the ankle and massage evenly and lightly for half an hour or more, the idea being to drive the blood away from the spot, where it would be likely to settle because of torn ligaments. If properly executed, massage of a sprain will relieve pain and reduce swelling. Massage with the back of the thumbs, using a circular motion, also gently use the parting movement already described. In the case of a bruise the idea in massage is to thoroughly drive the blood through the bruised part until new circulation is established. Both in respect of sprains and bruises the part should be bathed and subjected to hot fomentations after the massage and then properly bandaged. In the case of a bruise after-discoloration will often be avoided by binding a piece of well-pounded raw beef over the part for a few hours.

In the foregoing description of general massage some particulars are given as to massaging the face, but this is not intended as indicating the manner of using massage to retain or increase the beauty of the face. In the chapter entitled "Self Care for Women" there will be found a description of massage for these purposes, and which is quite distinct from the use of massage in treatment of disease as described in this present chapter.

MEDICAL SCHOOLS

PART IV.

CHIROPRACTIC

Chiropractic was discovered by Dr. D. D. Palmer at Davenport, Iowa, in 1895.

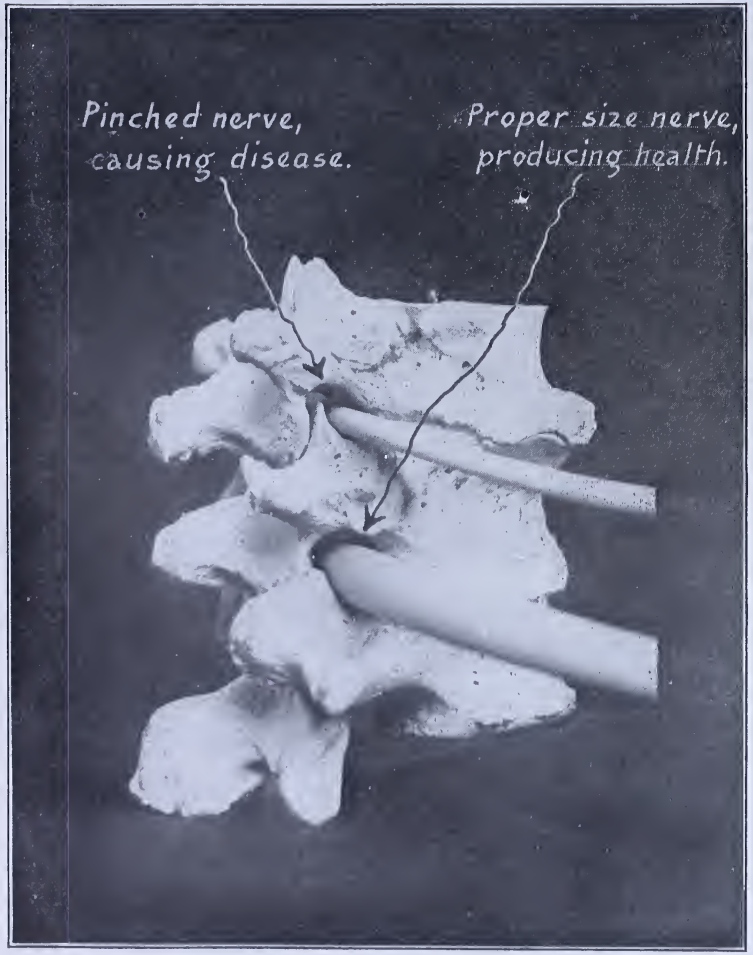
This science is based upon the fact that all disease is due originally to a condition in the individual, rather than to external influences. This condition is recognized by all schools of medicine as the "predisposition" or "lack of resistance." To illustrate: Thousands of persons continually inhale the germs of tuberculosis, yet only a small per cent. contract the disease. Scientists have answered this by showing that the germs only affect those who have weak lungs or a lack of resistance. Any physician will tell you that germs do not affect healthy people.

If this statement can be accepted, then why bother so much about the germs that do not affect 99 per cent. of the people when it is admitted that there is a condition existing in the other 1 per cent. that makes them predisposed to disease and easily affected. Why not find out and correct the cause of this condition or predisposition and so allow nature to use her natural protection against these baleful external influences.

Chiropractors, therefore, feel that this condition of predisposition is by far the most important part of all disease, and their work is confined solely to its correction, for even after a disease has fully developed, if this condition can be eradicated, nature can readily restore normal health.

While this condition of predisposition has been recognized by medical practitioners for many years, there is nothing in medical literature that will tell you what this condition really is.

Dr. B. J. Palmer, a son of Dr. D. D. Palmer, has been the greatest factor in the development of Chiropractic as a science, and was the first


Pinched nerve,
causing disease.
Proper size nerve,
producing health.

Opening for Nerve
too small.
Proper sized
nerve opening.

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to discover the real fundamental cause of disease. He maintained that the predisposition was simply a lack of function and that it was due to a partial displacement of a vertebra, with the result that the spinal nerve emitting from the cord would be "pinched," thereby interfering with the flow of nerve impulses.

Dr. G. H. Patchen, of New York, who has done a great deal of research work in Chiropractic, state the basic principles of this science as follows.:

1st. That all nerves originate in the brain, converge at its base, forming the spinal cord which passes out of the skull, through an opening called the foramen magnum, into and through the center of the spinal column. From the spinal cord nerve filaments emerge, on each side of the spinal column, through a small opening between each consecutive pair of vertebræ, from whence they proceed to the parts and organs into which they severally terminate.

2d. That the vitality and activity of every organ, tissue and cell of the body is maintained and controlled by an inherent force or energy, which is transformed or individualized by the brain, and then transmitted to these respective parts, in the form of mental impulses, through the channels provided by the nerves.

3d. That when the transmission of mental impulses is normal both in volume and rapidity of delivery, or, in other words, when 100 per cent. of mental impulses reaches each organ and tissue in the body in a normal speed, all functions are perfectly performed, with a result which is known as health. But when the normal flow of mental impulses is interfered with, in any manner, the vital activities of the tissues and organs which these mental impulses severally maintain is either increased or diminished according to the degree of interference, the result in either case being a condition which is recognized as some form of disease.

4th. That the only place where interference with the flow of mental impulses to a degree sufficient to cause deranged functional activity, or disease, *can* occur, is at the intervertebral foramina, the little openings between the vertebræ, on either side of the spinal column, already mentioned. At any of these places a slight misalignment or sublaxation of a vertebra may so press upon the nerves passing out through it as to interfere, more or less seriously, with their conductive power.

5th. That Chiropractic affords an exact and scientific method of determining the location of any vertebra which, on account of its misalignment, is responsible for nerve compression, and also an original, unique

and most effective manner for correcting this abnormal condition, by means of the hands alone, using either the spinous or transverse processes of the vertebræ as handles or levers.

Chiropractors correct these vertebral displacements by placing their patient on a divided bench and giving with their hands what they term an "Adjustment."

MEDICAL SCHOOLS

PART V.

HYDROPATHY, WATER-CURE OR HYDROTHERAPY.

History.—The use of water in the treatment of disease was practiced by the most skilled of all the Greek physicians, Hippocrates, 400 years before the time of Christ. Zechariah spoke of Christ as the healing fountain, and, in the thirty-sixth Psalm, David speaks of the fountain of life, showing that water was considered a healing agent even at that time. It was very extensively used by the Romans at the time of their highest development. During the middle ages it fell into dissue, along with many other rational agents. From time to time, however, men of more penetration than their fellows tried to restore it to general use, but usually only succeeded in arousing interest for a short time. Dr. James Currie, well-known as the editor of an edition of Burns' poems, who practiced in Liverpool from 1780 to 1805, was the most prominent advocate of hydrotherapy during the eighteenth century. He published a book entitled "Medical Reports on the Effects of Water, Cold and Warm, in the Treatment of Fevers."

Father of Modern Hydrotherapy.—But it was a German farmer, named Priessnitz, who must be called the founder of modern hydrotherapy. In the year 1840 nearly sixteen hundred persons visited Graefenberg to be treated by him. His patients came from all parts of the world, and when cured they became missionaries of the new treatment. Schools were started not only in Europe, but in this country also. There is every reason to believe that the water-treatment has now secured a permanent place among the remedies used in combating disease. Professor Wilhelm Winternitz, of Vienna, is to-day the leading advocate of this method of treatment.

Definitions.—Hydrotherapy is not a good term, since it is derived from two Greek words, which mean respectively, *water* and *to suffer*. It would, therefore, mean strictly water-suffering. The term water-cure is a good one, but may not be considered entirely scientific. Hygienic medicine is another term sometimes used for this method of treatment, but it is not

sufficiently distinctive. A far better name, however, is Hydrotherapy, which means *healing by water*. This expresses with entire correctness the end sought by those who practice this form of medication. It is not confined to the use of *cold* water only, as some have supposed. That idea may have arisen from the fact that Priessnitz was a special advocate of cold water.

Hydrotherapy.—*Hydrotherapy includes the application of water, internally and externally, in any form and at any temperature.* It may vary from solid or fluid to vapor; from ice to steam Mineral waters are not used in hydrotherapy. They are not needed. There is, however, no objection to such waters being used if they are available.

Physiology.—The effects of water upon the body are produced by its heat or cold and the manner in which it is applied. In order to understand this action it is necessary to consider the structure of the skin or outer covering of our bodies. It is an exceedingly complex and sensitive part of us.

The Human Skin.—The skin is very elastic, and this is due to the presence of a network of elastic fibres in its deeper parts. Many very small muscles are also present in the skin. When they all contract at once the appearance known as "goose-flesh" is produced. Great numbers of tiny glands are present, and their openings on the surface are called pores. But more important than any of these are the fine blood-vessels and nerves which are so numerous that it is impossible to pass the finest needle point into the skin without causing pain and bleeding. Through these the application of water can affect the entire system most profoundly.

FUNCTIONS OF THE SKIN.

Nerve Endings.—The fine nerve endings in the skin guard the body like an army of sentinels. They warn us of too great heat or cold, or draughts or threatened injury. Wherever these nerves are the more numerous there the sense of heat and cold is the more acute.

Skin Excretions.—The chief materials given off by the skin are watery vapor and urea, both of which are contained in the sweat; also a gas known as carbon dioxide. Urea, however, is more freely removed from the body by the kidneys. The amounts of these several constituents can be increased or decreased in a wonderful degree by applications to the skin of water at varying temperatures.

Skin a Heat Regulator.—The human body is remarkable in its power

to live under conditions so exceedingly variable. It can exist amid the burning heat of the tropics, or surrounded by the icy blasts of Greenland. The skin is one of the main agents in making this possible. So remarkable are its powers that in a hot climate it helps to cool the body, while in cold climates it prevents the waste of heat.

PROPERTIES OF WATER.

Value of Water.—The value of water as an agent in treating bodily ills rests in: First, its power of absorbing and transmitting heat and cold; one pound of water will absorb eight times as much heat as a pound of iron, and yet not be any hotter than the iron; second, its flexibility; water can be used in the solid, liquid or gaseous state; its volume increases seventeen hundred times in passing from ice to steam; third, its fluid form enables us to control it so easily and well that we can apply it at pleasure to any portion, or all of the body, as we desire, and for any length of time; fourth, the ease with which pressure can be applied to any part of the body through the force of the stream used. Any or all of these properties can be used at the same time in treating diseases by hydrotherapy.

Action of Water in Health.—The most important means employed in hydrotherapy is the application of water to the skin surfaces. It acts upon the nerve endings by heat, cold and impact. The nerves transmit the effects to the brain, where it may be switched off and sent to any part of the body. Thus the amount of blood at the body surface can be increased or decreased. The speed of the blood current can be altered and the blood itself improved. More blood can be sent to the brain, thus securing greater mental activity; or less blood being sent there sleep will follow. The pulse can be increased or decreased in force. The breathing may be increased in frequency and depth. The muscular system, too, is affected by the increased activity and the kidneys do more work. The body temperature can be directly affected. It is raised by hot and lowered by cold water. Three conditions, however, will be found to modify the last statements; these are the degree of temperature used, the length of time it is allowed to act and the manner in which it is applied.

THE PRACTICE OF HYDROTHERAPY.

Ablution.—This is the simplest and most widely-used method of applying water. It is effective in many diseases and is a good introduction to the other more active measures.

Definition.—Ablution is the application of water by the hand, without or with a bath-glove or washcloth. Sponges are not rough enough. The bare hand or a rough cloth can be made to produce just as much friction as is desired.

Method of Applying.—Have ready several vessels of water at the temperatures desired. In acute fevers with a temperature above 101 degrees Fahrenheit, first the patient should be stripped completely and covered with a blanket, remove the pillow, roll the patient upon his left side in the portion of the bed away from the one where you desire to work; lay upon the bed a rubber sheet or oil cloth, covered by a blanket. This should be so placed that its near edge will overhang the bed, while the remainder is tucked against the patient's back. He is then rolled over again toward the nurse, while the rubber sheet and blanket are smoothed out on the opposite side of the bed. The patient can now be rolled upon his back, and you are ready to begin the bath. If the patient is a child he can be lifted from the bed, wrapped in a blanket, while the rubber sheet is being adjusted. Beginning with water at 65 degrees, first wash the face, dip the hands into the water and rapidly but gently apply it to the part, using gentle friction; next go to the chest, forearms, back, abdomen and legs as far as the knees. Repeat the process in the same order, but with water at a lower temperature, and so on until water at a temperature of 50 degrees is used. The ablution is continued until slight chilliness is produced. When the effect is sufficiently marked the patient is dried and allowed to remain perfectly quiet, with only a sheet or light blanket over him. Do not attempt to replace the nightgown until reaction is fully established. If sleep follows let the patient remain undisturbed until he awakes.

In vigorous persons with high temperatures the effect may be made more pronounced by not drying the parts, but by simply spreading a sheet over the patient and allowing him to dry gradually. Care must be taken not to produce chilling.

In Chronic Affections.—Ablution is useful as a beginning treatment. It may be used in the following way: A bed is prepared as described above; the patient is then stripped and laid upon the under blanket, with the arms raised above the head. The blanket is then folded over the body and between the limbs, hugging the surfaces closely at all points. The arms are now brought down close to the sides and the other side of the blanket laid over all and tucked in around the neck and under the feet. This should be done in a warm room and the patient given sips of cold

water to drink at intervals of a few moments to promote sweating. More covers may be used if needed. After a half to one hour the patient's face is bathed in water at 50 degrees Fahrenheit. The blankets are now loosened and each part—arms, chest, back, abdomen and limbs—bathed in turn in water at 80 degrees. They are then dried and replaced under the blanket. A dry rubbing with hands or a towel follows and a short period of exercise is then ordered if the patient is able. If unable to exercise he should remain in bed and take a cup of warm liquid food. Morning is the best time for this procedure, but is useful whenever it can be had.

General Ablution.—The next step in the training is a general ablution. The patient stands in twelve inches of water at 95 degrees, and is quickly washed from head to foot by pouring water upon him and rubbing at the same time. The heat of the water will vary with the patient and his length of training, from 80 degrees to 50 degrees. The great importance of care in these measures cannot be too deeply impressed upon all who undertake them. In chronic conditions the patient must be wooed back to health slowly, realizing all the while that a very small accident may destroy the results of weeks of patient care. It is not sufficient to advise a sick man that he should bathe in cold water every day. He must know just how, when and where, and also how long the bathing should proceed, and what changes are needed and when they should be made.

When May Ablution be Used?—General ablution may be used in febrile diseases to reduce fever and at the same time prevent its rise. In mild cases of infectious fevers like measles it may be all that is necessary throughout the attack; typhoid fever, in which the temperature does not go above $102\frac{1}{2}$ degrees; in severer cases more extended baths are indicated. In chronic cases of anemia and chlorosis, which are due to poverty of the blood, tuberculosis of the lungs, rheumatism, gout and loss of nervous tone. In the most severe cases of the last class it is a good introduction to more severe treatment.

The Half Bath.—How applied: Into an ordinary bath-tub enough water is run to cover a patient's hips and limbs. The temperature may vary from 85 to 70 degrees. The patient enters the bath, or, if too weak, is placed in it. A wet towel is wrapped about his head and the nurse proceeds to bathe his face and then dash the water over his body with a ladle. At the same time the patient's back is rubbed by the attendant, while the patient himself rubs his own chest and abdomen. Cold water is added gradually and the process continued until the patient shivers. He is then

removed before chilling ensues and dried before returning to the bed. This is a more stimulating procedure than ablution.

When Used.—In chronic diseases, after the wet pack or procedures yet to be described, the half bath naturally follows to insure the closing of the pores and general reaction. It should continue from five to ten minutes. The patient should be rapidly dried, and in fever cases this may be done in bed.

Affusion.—Definition: Affusion is a bath by pouring.

How Applied.—The patient may sit or stand in an empty tub or lie upon a rubber-covered cot while water is poured upon his head, shoulders and body in a stream from a bucket, pitcher or basin. The temperature of the water may be varied from 65 to 50 degrees, and may be poured from different heights. The stimulation will vary with the temperature and height. The reclining and sitting postures are used for acute cases and the standing for chronic.

Indications for its Use.—When patients are unconscious or delirious and seem absolutely exhausted, ablutions will often result in very surprising improvement. In advanced fever cases, when collapse is threatened, instead of injuring the heart action, they help it materially. In the collapse of children's diseases a warm half bath, with affusions over the head and chest, will often restore completely. In diseases of the lungs, when breathing is difficult; in scarlet fever, with very high temperature, they will bring relief when all other methods fail. They are a better stimulant to the circulation than the most powerful medicines. In brain fever or meningitis, sunstroke and the brain symptoms of pneumonia they are the most useful agents known.

The Sheet Bath.—Method of applying: Protect the bed by a rubber sheet, spread a blanket upon it, have ready several linen sheets, a basin, a tub of water as cold as desired, 50 to 80 degrees, and nearby on a chair place a cup and sponge. The patient should be undressed and ready, wrapped in a blanket or woolen gown. Wash the face with cold water and wrap a cold wet towel about the head. A sheet is now quickly wrung out of the water selected and spread evenly upon the bed. On this the patient is laid, and while he holds his arms up over his head one side of the sheet is brought over and tucked in on the opposite side and between the limbs. The arms are then brought down, and the opposite edge of the sheet is carried over and tucked in around the patient's neck and feet. In feeble patients the arms may be left out and bathed separately during the process. The first effect of this procedure will be a shock to the surface

nerves by contact with the cold wet sheet. For a moment the breath will come in gasps and some shivering may follow. These quickly pass away as the nurse begins to rub the body by passing the open palms swiftly over all parts of the body and limbs. As soon as reaction follows, begin to pour water at 50 or 60 degrees temperature from the cup or squeeze it from the sponge over the body, rubbing at the same time with the other hand. Keep this up until the patient is cooled as much as desired or until he is on the verge of a chill. The combination of friction and cold water application through an enveloping sheet is an admirable way of securing the abatement of fever. To increase or prolong the effect allow the patient to remain in the cold sheet, covered by a blanket, from a half to one hour. If he sleeps do not disturb him until he awakes. When it is desirable to end the bath, remove the sheet, dry the patient quickly, place him in a dry bed and cover lightly.

Drip Sheet Bath.—How applied: This is applied while the patient is standing. The room should be at 70 degrees or over. Place the patient, completely stripped, in a foot-bath of water at 100 degrees Fahrenheit and six inches deep. A sheet is now removed from a bucket of water at 70 degrees and rapidly wound about the patient in the following manner: The right arm is held above the head while the edge of the sheet is placed upon the right breast. The sheet is then carried backward under the arm, which is now lowered, and serves to keep the sheet in place. The edge is now carried over the left shoulder, across the breast, over the right shoulder, and tucked in snugly about the patient's neck. As soon as it is in place the nurse proceeds to stroke the body rapidly from head to foot over the sheet and slap it more or less vigorously. Water at 60 degrees is poured upon the head at intervals of a few moments and the rubbing continued between the dashes of water. The process is kept up from five to ten minutes, according to the condition of the patient and his requirements. At first it should be very short in order not to weary him; gradually it can be lengthened as the power to react increases. After the bath dry rapidly, then rub with a warm towel or sheet. This bath is applied once a day and best during the afternoon.

Uses of the Drip Sheet Bath.—Many chronic ailments are benefited by it, such as chlorosis, anemia, neurasthenia, intestinal catarrh, melancholia, neuralgias, pulmonary and bronchial diseases. Its application can be varied in a great variety of ways.

The Cold Rub.—Definition: This is a modification of the drip sheet

and is generally applied immediately after the patient arises in the morning and while he is still warm.

Application.—A coarse linen sheet is wrung out of water at 60 to 75 degrees and quickly wrapped about the patient in the manner described above. Friction is now applied rapidly over the sheet, accompanied by slapping, the object being to produce a definite reddening of the skin. This is only a short process, and when finished the sheet is dropped and the patient quickly dried. After dressing and drinking a cup of hot milk or cocoa the patient should take a walk in the open air.

Uses.—In anemias of feeble patients, tuberculosis of the lungs, any case lacking in blood.

The Wet Pack.—How applied: The method is very similar to that described in the preparation for ablution. The body is, however, first enveloped in a wet sheet in the manner described, so that it will lie in contact with every part of the body. The sheet should be wrung out of water at 70 degrees, or even as low as 60 degrees. Over this a blanket is folded so snugly that all outside air is excluded. A wet towel is folded about the head like a turban. If the patient feels cold more blankets are placed over him. He should remain in the pack from a half hour to an hour. It should be followed by some form of cold application to restore tone to the skin. A half bath, heat bath or cold ablution will serve this purpose.

Uses.—If it is desired to abstract heat the sheet should be 60 to 70 degrees. When it has become warm replace by one a few degrees colder on a fresh bed, and so on until the desired body temperature is reached. It is estimated that five baths, each of ten minutes, will equal a full bath of fifteen minutes' duration. With temperatures varying between 100 and 103 degrees this is an excellent procedure. When used to quiet restlessness and promote sleep the higher temperature of water is used, say 70 degrees, and the patient is allowed to remain in the pack until he awakes; he is then given a rapid cold ablution. The wet pack is useful in most of the acute fevers at the outset. The addition of salt or other medicines to the water is sometimes advised.

In Chronic Diseases.—In these cases the pack should not be quite as low in temperature. The cold stage lasts longer, reaction comes on more slowly, but when it does the soothing and refreshing effect is very evident. The whole body is in a sort of water poultice. It is valuable in functional nervous diseases, hysteria and some heart troubles. In tuberculosis of the lungs, with fever, it is found very effective. In diabetes, rheumatism,

gout and digestive disorders, anemia and chlorosis it has proved very effective.

The Wet Compress.—This is probably the most extensively used of all hydriatic procedures. It is in fact a local wet pack.

Method of Use.—Several folds of old linen or cotton, gauze or cheesecloth, sufficient to cover the part to be treated, are wrung out of water at the proper temperature and placed upon the part. A dry flannel or piece of oiled silk or rubber band sufficient to cover the compress follows, and over this a retaining bandage.

The Head Compress.—Take a linen towel wrung out of water at 60 to 75 degrees and apply it like a turban to the head. This is used to prevent congestion of the brain and during all hot baths and wet packs.

The Throat Compress.—It should be made and applied as follows: A piece of flannel, 8 x 24 inches, is made ready; then a compress of soft linen, four inches wide and long enough to reach from one ear under the chin to the opposite ear, is soaked in water at 60 degrees and laid upon the throat; the flannel bandage is next placed on it and drawn up snugly over the head, to be fastened by pins. A slit for each ear to be cut in the flannel if it is uncomfortable. Two bandages are made so that one can be dried while the other is in use. In children it is wise to first put a band around from the back of the head to the forehead, to which the upper bandage can be pinned at the intersections.

The Chest Compress.—Make two jackets out of three folds of old linen. They should be large enough to reach from the neck to the waist and entirely around the chest. At the points, by measure, where the two armpits will come cut a deep slit so that the arms may sink in far enough to allow the ends to be pinned over the shoulders from front and back. Cut two pieces of closely-woven flannel of the same shape as the jackets, but about an inch larger in every direction. Roll up one of the compresses and wring it out of water at 60 degrees. Spread it upon one of the flannel covers and roll them up together halfway. Now, with the patient gently turned on to one side, spread the unrolled portion on the bed behind him, so that he can be rolled back upon it in just the right place, to fit. Now unroll the remainder and bring the ends together across the chest, fastening them with safety pins. Also pin the portions at the top over the shoulders. This compress should be changed every half hour when the temperature is 102 degrees or over, hourly when the temperature is below that and down to 99½, when it should be stopped. Always have the fresh compress entirely ready before loosening the first. Thus, one movement

of the patient will be sufficient to remove the old and apply the new compress. Use fresh water at 60 degrees each time and always rinse the compress between using to keep it clean. Continue the changing night and day unless the patient is asleep. By being so thorough and careful the patient's chest will never be without a compress except at the brief moment when one is being rolled from and the other being unrolled upon his body. If stupor and low muttering delirium are present, use water which is colder than 60 degrees, also throw a few dashes of ice water on the chest before placing the fresh compress. When insomnia is marked use water slightly warmer than 60 degrees. These methods are used in croupous and broncho-pneumonia.

The Hot Fomentation Compress.—Two or three folds of flannel, as large as desired, are wrung out of boiling water, making it as dry as possible. The part should be anointed with vaseline and the hot flannel applied as quickly as possible, so as not to lose any of its heat. Surround the patient with a dry blanket over the compress. It may be necessary to lead up through several temperatures before the very hot compresses can be used. These compresses should be renewed every ten or fifteen minutes until the patient sweats. After the pain is relieved the body may be carefully uncovered and quickly rubbed dry or washed with water at 75 degrees, accompanied by friction. In sciatica nothing exceeds this method of treatment. In lumbago and other muscular rheumatisms a hot fomentation each night will soon result in relief.

The Heart Compress.—Wring out a piece of linen from water at 40 degrees and lay it upon the heart. On this place a rubber coil and pass ice water through it. A flannel binder will keep all in place. This is especially useful in irregular heart action, due to nervous conditions, in rapid heart action in some very weak patients. It will also be effective even when digitalis has failed. It can be used in a course of severe fevers, such as typhoid.

The Cold Full Bath.—By this is meant the placing of the entire body in water 10 to 30 degrees below the normal body temperature for from five to twenty minutes. It is this form of bath which has revolutionized the treatment of typhoid fever. Its application varies with the ends in view. In acute cases it should be applied as follows: A movable bath-tub is provided, if possible, and rather than use the ordinary house bath-room an improvised bath apparatus is advisable.

Method of Applying a Tub Bath.—When the tub is ready the patient is stripped and a breech-cloth applied, or he may be left enveloped in a

sheet. A stimulant is then given, either hot coffee or half an ounce of whiskey. Two attendants then lift him carefully from the bed and place him directly in the bath. A towel soaked in cold water is bound about his head. The head is supported by a strip across the tub or a rubber cushion. If neither of these are available one hand of the attendant must support the head while the other is employed in the rubbing process. Both attendants vigorously rub the patient from head to foot. From time to time fresh cold water is poured upon the head and face. The rubbing is an absolute necessity in this form of bath. There is always some shock when a patient is placed in cold water, but under brisk rubbing the surface is warmed and stimulated, so that there is a continuation of little shocks and reactions. As rapidly as the surface is cooled the blood is pushed forward and fresh hot blood from the deeper parts takes its place and is in its turn cooled. The process continues thus until the temperature falls sufficiently or the bath is continued long enough, or the danger of severe chill makes it wise to end the bath. The bed in the meantime has been spread with a blanket and dry linen sheets; the patient is lifted from the bath and placed upon the bed. The sheet and blanket are then folded over from one side under the raised arm and tucked between the limbs, then the other half over the arms, so enveloping the whole body. Very frequently he will fall asleep. If shivering is prolonged it is an evidence that the bath has been too cold or too long, and a change should be made at the next application. If reaction does not come on promptly hot water bottles or bricks should be placed to the feet and between the limbs. Friction must always be used in the cold bath treatment. If it is neglected the bath will really be a cause of increasing the fever by closing the pores and contracting the surface blood-vessels.

The Warm Full Bath.—The warm bath is one in water a little below the normal body temperature. Hot baths are those with the temperature above the normal body temperature. These baths should be arranged so that the temperature may be increased after the patient is in the water, either by kettles of hotter water or by gradually increasing the water from a hot faucet. They should last from five minutes to an hour, according to the object sought and the conditions being treated. Their general effect is soothing, although the very hot baths are stimulating; for example, those of the Japanese at 130 degrees Fahrenheit. Warm baths are useful in relieving pain and nervousness, reducing temperature, the latter especially in children and infants. Care should be taken to dry thoroughly after baths and protect from draughts.

The Hammock Bath.—The hammock bath is a means of applying the effect of water through long periods of time. An extra deep tub is used, the patient is swung upon a strong sheet which is fastened to the edges of the tub or to a framework over it, so that the water surrounds him up to his neck. Constant renewal, by the inflow of water at a given temperature.

The Douche.—This is the application to parts or the whole of the body of a stream or streams of water at varying temperatures. Moreover, the stream should be under different degrees of pressure. When the stream is made to take a form which is broad and flat it is called a fan douche. This is made by partially closing the outlet or nozzle by the thumb or finger. The shower bath is another form. In this the pressure ought to equal the fall from a cistern fifty feet above the outlet. The needle or circular bath is one in which the water is forced against the body in fine jets from all sides at once. The ascending or bidet douche is one in which a jet is directed upward from below, usually while the patient is sitting, and is used in rectal treatment to overcome piles.

The Hip-Bath.—The hip- or sitz-bath, as its name implies, is one applied to the lower part of the body only. The bath is first prepared, then the patient stripped, a wet towel bound about the head and a warm blanket about the feet. Sometimes it is wise to add a hot-water bottle with the foot blanket. When the patient is in the bath the under side of the knees should not rest upon the tub; if they do a stool should be placed under the feet. Rapid friction should be used over the parts in the water by an attendant and also the patient himself. When the bath is over dry the patient and have him return to bed for a short rest, or, if an invalid, remain there. Hot baths are 104 to 110 degrees Fahrenheit, cold baths as low as 50 degrees. All grades between these are used. The duration of hip-baths may vary very greatly. Hot hip-baths are used to overcome pain in the abdomen and pelvis, to reduce inflammation of the pelvic organs, to cure cystitis, urethritis, uterine hemorrhage, diarrhœa and dysentery, and especially vesical straining.

Uses.—Cold hip-baths of short duration are stimulating and are used to overcome muscular paralysis or loss of tone, in prolapsus of the rectum, spermatorrhea, prostatorrhea, impotence, weakness of the uterine ligaments, prolapsus of the uterus, the leucorrhea of chlorosis, stoppage of the menses, passive bleeding, constipation and flatulency.

Steam.—Vapor of water, with or without medicines, has been used for softening the mucus in case of croup, laryngitis, false-croup and

diphtheria. A tent or canopy is arranged over the patient and the steam conducted under this from one or more kettles kept heated by alcohol lamps or any other available method. When nothing else can be found heat some bricks or stones and drop them into buckets of water under the tent until sufficient steam has been generated. Steam is also used to check bleeding by some surgeons; also as a cleansing agent in some operations for cancer.

The Turkish Bath.—This, as its name implies, has come down to us from the Turks, and they obtained it from the Arabians. It consists first of a soujourn for a considerable time in a hot-air chamber, with a temperature from 105 to 125 degrees. The patient remains in this room until he is in a thorough perspiration; he is then laid upon a table and an attendant rubs him thoroughly with his hands and kneads the flesh from head to foot. The attendant scrubs him with soap and water, using a brush, and finally washes him off with warm water. After another short stay in the hot room the patient stands for a few moments under the shower bath and is then wiped dry. He then passes to what is known as the "cooling off" room, where he lies quietly upon a cot; the temperature of this room is usually 80 degrees. A quiet sleep will often follow the bath, and after it the patient should be rubbed with alcohol and take a cup of coffee or chocolate before dressing and leaving the bath.

Russian Bath.—This bath differs from the Turkish in that the first chamber is filled with steam instead of dry air, and the final process before drying is a cold plunge into a tank or swimming pool. The latter may be replaced by pouring cold water over the bather. The last two methods are used to reduce flesh, particularly in corpulent individuals. In well-nourished, rheumatic and gouty patients, in neuralgic affections, in persons of this same class, these baths will be especially beneficial.

HYDROTHERAPY IN SPECIAL DISEASES.

Typhoid Fever.—The following methods may be used in treating this disease:

1. Ablutions and compresses until the temperature has reached 103 degrees, or when the cold baths are impossible.

2. The cold bath; a bath at 65 degrees, lasting fifteen minutes, whenever the temperature rises to 102½ degrees, in the rectum.

3. If this method is not advisable the Ziemssen half-hour baths may be used, where the water is reduced gradually from 90 to 70 degrees.

4. In very weak, nervous patients, coming under treatment in the second week or later, only five- or ten-minute baths at 88 to 95 degrees, followed by short cold effusion, or a wet pack, should be risked. The temperature and duration of the bath can be altered with the improvement of the patient.

5. The hammock bath, as described above, can be substituted in treating very timid patients.

Measles.—With a temperature at 103 degrees a bath of ten minutes in water at 95 degrees is very soothing. It should be repeated every four hours and the water temperature reduced five degrees each time until the desired effect is produced. The patient generally falls into a quiet sleep after such a bath. When the full bath cannot be given ablution may be used rapidly, but without friction. Cerebral symptoms should be overcome in this way. The half-bath can be very successfully used in measles. This may be repeated oftener than the full bath. Do not wait too long before beginning the water treatment. If the patient's nervous tone is kept high by the above methods there will be less likelihood of any lung complications beginning.

Scarlatina.—In the early stages, before the diagnosis is sure, a warm full bath at 100 degrees, for a few minutes, will quiet the patient wonderfully. If the heart action is feeble, the bath should be followed by a few dashes of cold water over the shoulders and chest, or the latter method may be used without the full bath. In urgent cases an effusion may be used every hour until reaction is sufficient and the heart is relieved by bringing the blood to the surface. When the eruption is well out and the mind clear there is not much need for treatment; but when temperature is high or mind clouded and congestion evident ablutions with water at 90 degrees, gradually reduced to 75 degrees, are very effective. The time occupied in a single ablution should be short, as it is the nervous system that we wish to affect more especially. The number of ablutions will depend upon the result obtained. It may be necessary to have them repeated every hour.

Pneumonia—1. In Children.—Begin bathing when the temperature reaches 103 degrees, or earlier if nervous symptoms are marked. The bath should begin at a temperature of 95 degrees and last for ten minutes. They should be repeated every four hours, and the temperature of the water decreased two degrees each time until 80 degrees is reached. Never omit friction. Between the baths, in bad cases, use the chest compress every one or two hours. If alarming symptoms appear, or heart failure

is feared, place the child up to the waist in a bath at 100 degrees and dash several basins at 75 to 65 degrees over the shoulders. Follow this with rapid friction and drying. Repeat this process as often as every two hours if necessary. Crying and coughing are caused and they are a wonderful help in relieving the congestion. In less severe cases, wet packs, ice jackets or cold sponging may be sufficient.

2. In Adults.—The greater difficulty in applying baths to adult patients and the fact that practically as good results can be secured in another way, have led to the adoption of the latter plan, which is the chest compress. The full bath can be reserved for the more urgent cases. The warm half-bath and cold effusion to the chest are also exceedingly valuable in emergencies.

The Chest Compress.—This has been described in the foregoing pages. Do not neglect the careful observance of all the details. Usually a temperature of 60 degrees is best, but in cases with stupor or muttering delirium a lower temperature will be needed. Dashes of ice water can be used when the compress is being changed. If there is sleeplessness or excitability allow the compress to remain for two hours, or even longer, without changing; this will increase its soothing effects.

Acute Cholera Infantum.—The element of shock in this disease is so decided that the attacks resemble sunstroke. The internal temperature is often very high indeed. Reaction must be secured quickly or it will be too late. It is sometimes necessary to proceed with these measures before attending to any of those which logically precede, as indicated above. Prepare a bath at 90 degrees, wrap a cold cloth about the child's head and have it supported by an assistant. Lower the child's body into the bath, holding it by the hands and feet. Begin gentle friction over the different parts of the body, arms and legs to the elbows and knees. Have another assistant remove water from the bath and replace it with ice water until the temperature falls to 80 degrees. Continue the bath ten minutes, or if shivering occurs before that time remove the child. If the temperature has been very high follow the bath by a wet pack and a blanket over that. Put hot bottles to the feet and keep the head cool. If the symptoms are not so urgent a wet pack alone may secure the desired reaction.

Sunstroke.—Put the patient upon a rubber-covered cot, cover him with a sheet, dash upon him, at intervals, dipperfuls of cold water, in the meantime keeping up constant friction over all parts of the body and limbs. Keep an ice-bag or cold cloth upon the head, and occasionally pour ice water upon the forehead from a height of six feet. The friction

must not be neglected under any circumstances. When the rectal temperature has fallen to 104 or 103 degrees wrap the patient in dry blankets, with hot bottles to the feet and limbs. Usually the patient will fall asleep and break out in a gentle sweat. If reaction does not occur and the temperature again rises repeat the above treatment. Continue thus until the temperature remains down. As soon as the patient can swallow give small drinks of ice water at frequent intervals.

Anemia or Lack of Blood.—Here we must distinctly understand that we are not to abstract heat from the body. On arising in the morning the bath should be taken as follows: In a room the temperature of which should not be lower than 68 degrees. Let the patient stand in water at 100 degrees and pour over him water at 80 degrees and at the same time have him rubbed thoroughly and let him rub himself. Reduce the temperature of the water 2 degrees each day. Dry rapidly after the bath, dress and let the patient take a short walk in the open air. In weak patients the dry pack may precede the ablution.

Consumption.—To give a consumptive patient full benefit of the water treatment it should be begun and carried out systematically. If the body is already well cared for the treatment can begin at once, if not, a good warm water and soap bath must be given on the first day, and then the following day proceed thus: Strip the patient entirely naked, wrap him in a blanket, cover him with other blankets and give small drinks of water at short intervals, say every ten minutes. During this dry pack the windows may be wide open even in winter. After an hour has passed wash the face with quite cold water and dry. Have a basin ready with water at 75 degrees, remove one arm from the covers and wash it briskly with the wet hand or with the hand covered by a bath glove. Rub well and then dry and replace. Do the same with the other arm, then the different parts of the body successively. At the end rub the entire body with a rough towel. Repeat this treatment daily until, by reducing the temperature 2 degrees daily, the water is used at 60 degrees.

Neuralgia.—In this trouble great relief has resulted from the various water methods of treatment. Especially good results have followed when rapid contracts of temperature have been used like that obtained in the Scotch douche. In sciatica this treatment has been wonderfully successful.

Chronic Rheumatism and Gout.—These cases may be divided for treatment into two classes:

1. The Well-Nourished Subjects.—These should be given full baths for from eight to fifteen minutes, in water at 95 degrees, gradually raised to as high a temperature as can be borne; gentle massage to be given during the bath. Allow the patient to drink large quantities of water both during and between the baths. The bath should be followed by sweating between blankets. These baths should be given daily, or less often according to the patient's condition and progress. Between the baths cold wet compresses at 65 degrees can be bound upon the affected parts and allowed to remain until almost dry. Such compresses may be used during the night. A sweat in the cabinet for five to fifteen minutes followed by the douche at 100 degrees, reduced to 90 degrees during the progress of the bath, will be found very useful after the above courses.

2. The Poorly Nourished.—Hot baths must be used very cautiously and infrequently in this class of treatment. Once or twice a week will be found sufficient. Ablutions gradually decreased in temperature are most effective. Scotch douches to the joints, followed by cold compresses, should also be used. As the patient becomes more used to lower temperatures the baths may be made more stimulating. More food will be taken, digestion improved and the patient gradually increase in weight and strength.

Dyspepsia.—Catarrhal and nervous types of this diseases are recognized. The treatment is similar to that for anemia. As a local stimulant the Scotch douche over the region of the stomach is very effective. The hygienic rules must be carefully remembered during the treatment of this condition. The daily cold plunge bath, or its equivalent, will be a great help.

THE INTERNAL USE OF WATER.

Effects.—Drinking cold water slows the pulse and makes it stronger and fuller. Hot water weakens and makes it rapid. Cold water is the best diuretic, warm water the best diaphoretic or sweating agent.

Acute Infectious Diseases.—The method of using cold water externally in the treatment of acute diseases has been detailed in the previous pages, but the good effects of that treatment will often be lost unless enough cold water is given internally. At least a glassful of cold water should be drunk every two hours by a patient suffering with fever. The drinking of so much water insures a good flow of urine and increases the perspiration.

Gastric Catarrh.—A pint to a pint and a half of water, taken a half-

hour to an hour before meals so hot that it cannot be drunk but only sipped, will cleanse the stomach and prove an excellent stimulant to the muscular walls of that organ. This method of treatment has been very widely employed, but has often failed because the water was not drunk at a sufficiently high temperature. The administration of water to babies has already been mentioned.

MEDICAL SCHOOLS

PART VI.

ECLECTIC MEDICINE.

Name and Principle.—The name eclectic means choosing, and it refers directly to the means used for treating disease. It implies a selection of methods and remedies from all other systems of practice. "The great principle upon which eclecticism is based is: *that disease, wherever met, and in whatever form manifested, is an impairment of vitality; that causes of disease are depressing and, whilst they exist, lower vital powers.* The corollary from this is, *that all agencies employed in the treatment of disease should act in one of two ways—removing the depressing cause, and increasing the vital powers for better resistance and subsequent restoration of structures and function.*"

Belief.—The eclectic schools of medicine believe in the curative power of nature. They claim that medicines can be useful only as they aid nature in her endeavors to cure the diseased condition.

All the remedies known as antiphlogistic are discarded: bleeding, mercurials, antimony, and so forth. They avoid the use of mineral poisons for medical purposes. They seek to remove the cause of disease through the natural outlets of the body, and foster those measures which result in a better renewal of life. They treat the cause rather than any special symptoms which result from its presence.

CONDITIONS OF HEALTH.

1st. A general bodily expression of vigor, the face being the chief indicator.

2d. No painful or unpleasant sensations should be present.

3d. The bodily heat should be 98.4 degrees Fahrenheit.

4th. A pulse of 72 beats each minute, regular in force and time.

5th. A good appetite and digestion, with a daily bowel movement.

6th. The skin and kidneys should be acting normally.

7th. Well-balanced nervous system and a clear eye.

CONDITIONS OF DISEASE.

Any deviation from the condition just described would constitute disease, but we do not usually speak of a condition as disease until it has been in existence long enough, or become strong enough, to make its

presence inconvenient or troublesome to the patient. The following are some of the conditions which indicate disease:

1st. The face of the patient, his position and actions show signs of suffering.

2d. The temperature may vary widely from the normal. It may fall to 95 degrees or lower, or rise to 107 degrees or more. The presence or absence of fever can be discovered to some degree by the hand, but far better with a thermometer.

3d. The pulse may be increased or decreased in frequency; may become harder or softer than normal; may be irregular in rhythm or force.

4th. The stomach and bowels may be disturbed, and this will be indicated by the condition of the tongue.

5th. The urine and discharges from the bowels may be very much altered. The skin will be rough and harsh to the touch, and during fever hot and dry.

6th. The nervous system may present a great variety of symptoms. The eye will be dull and heavy except in special diseased conditions.

ECLECTIC DIAGNOSIS.

A consideration of the symptoms present in a given case leads to a conclusion regarding its character. That is called making a diagnosis.

Diseases are known by their features in the same way that we know our friends and relatives by their features.

ECLECTIC TREATMENT.

The medicines and methods used in caring for a sick patient are termed the treatment. These will be indicated in connection with each condition as it is described later. One thing only need be said here: *"Never give medicine unless you are positive that it will relieve present discomfort and shorten the duration of disease."*

FEBRILE DISEASES.

Fevers are of two classes: 1st. Those which have a local cause in one or more of the organs of the body; 2d. Those in which no such local cause is found, but in which the fluids of the body are involved in disease.

Phenomena of Fevers.—The advent and course of a fever is, in general, as follows: 1st. A period of gradual approach called the *incubation*

period or *onset.* It is known by the feeling of weariness, dry skin, cold hands and feet, loss of appetite, with headache and disturbed sleep.

The Cold Stage.—2d. This is usually known by the chill which occurs. Severe headache and backache. The hands and feet become icy cold, the lips are blue and the face very pale. This stage may last only a few minutes or may be prolonged to several hours.

The Hot Stage.—3d. At this time the pulse becomes rapid. The color returns to the face and is increased. The body heat rises, sometimes very high. The skin remains hot and dry. The length of this period varies greatly in different fevers. Following it we have

The Stage of Decline.—4th. This leads to recovery. The various symptoms become less and less severe. The skin becomes moist. The secretions begin again and gradually all the functions resume their normal course.

Fevers are divided into two classes according to their course: intermittent and continued.

INTERMITTENT FEVERS.

Treatment.—This class of fevers is the result of poisoning by malaria. In the stage of onset they may be aborted by a brisk purge, an emetic and a sweat. In the cold stage the patient should be treated by a hot mustard foot-bath and then placed in bed, well covered by blankets, with hot bottles or bricks to the feet and limbs, and given frequent drinks of *ice* water or very hot coffee or water. During the hot stage cold drinks should be administered; the body frequently sponged with cold water, and then lightly covered and protected from draughts.

Between attacks the patient should remain in bed if he is at all prostrated. He should be given quinine in large enough doses to cause the ears to ring. It is best given in solution. The following prescription is a good one:

R.—Quinine ..... 2 drachms
Water ..... 1 ounce

Give half a teaspoonful in a glass of water every three hours. A double dose should be given about two hours before the time of next expected chill.

When the stomach will not retain quinine it may be used in an ointment:

R.—Quinine ..... 1 drachm
Lard ..... 2 ounces

This should be rubbed into the skin, especially the parts under the arms and on the inside of the thighs. The amount above indicated should be used every day if the patient is an adult. It will be sufficient for four days in a child five years or under.

When Quinine Fails.—When quinine fails, or is too slow in its action, the following may be used:

R.—Strychnine ..... 2 grains
Dilute muriatic acid ..... 2 ounces

Water enough to make half a pint. Give one teaspoonful every three hours to an adult. Another remedy is common salt:

R.—Salt ..... 3 ounces
Powdered alum ..... 3 drachms
Boiling water ..... ½ pint

Give a teaspoonful every two hours during the absence of the fever.

CONTINUED FEVERS.

Febricula or Little Fever.—This may be caused by a single cold, by constipation (especially in children), catarrh, simple sore throat, indigestion and slight congestion of the lungs.

Treatment.—Relieve the bowels, if necessary, by an enema. Place the patient in a full warm bath, rub briskly after it, and follow with a hot mustard foot-bath. Place him in bed between blankets and give frequent cold drinks until he sweats. Allow him to sweat for half an hour, then rub dry and remove all but the lightest blanket. Allow him to go to sleep and he will probably wake up entirely recovered.

TYPHOID OR ENTERIC FEVER.

There are three conditions of this fever which have received separate names: 1st. Those which are so mild that they are not usually considered to be typhoid at all, and known as synochal fever; 2d. Those that are somewhat more severe, but run a shorter course than most cases of typhoid,

and are called synochoid fever. They are, however, all caused by the same poison and should be classed with (3d) *Typhoid Fever.*

Typical Typhoid.—A typical case of typhoid fever has a stage or period of onset covering about one week. The usual symptoms of that stage will be present, but the gradual daily increase of fever will be quite apparent. The face will acquire a dull, spiritless aspect and the patient may be somewhat drowsy. About the eighth day a few fine, so-called, rose spots will appear upon the abdomen. Their distinguishing feature is that they do not disappear entirely when the skin upon which they rest is stretched. This fever is self-limiting, so that the treatment is nearly all comprised within the field of good nursing.

Diet.—Certain rules, however, must be adhered to very strictly. No solid food should be given at any time during the illness. Liquid food should be given every two or three hours, according to the needs of each case. At times it is necessary to awake the patient during the night to give nourishment. Milk, beef tea, albumin or white of egg, the entire egg raw, and beef extracts will be found useful.

The Bath.—Plenty of water should be given if the patient desires it. A soap and water sponge bath should be given daily. As often as the temperature goes above 102 degrees Fahrenheit an ice-water sponge bath, with friction, should be given. If these do not prove sufficient to keep the temperature under control full tub baths should be used. The water should be 85 degrees Fahrenheit when the patient is placed in it. Ice is then added gradually until the water is only 65 degrees Fahrenheit. Rubbing should be employed during the entire bath, which should continue for 15 or 20 minutes, or until the patient's teeth are beginning to chatter. He should be lifted out and quickly dried, then laid on the bed with a blanket over him until reaction follows. The blanket is then replaced by a sheet and the patient allowed to sleep if he desires. Usually a stimulant is given before each tub bath. This may be half an ounce of whiskey or brandy.

Disinfection.—All urine and bowel discharges should be disinfected before being thrown out. Probably the best thing to use for this purpose is a saturated solution of *Chlorinated Lime* or Bleaching Powder. Use a tablespoonful to each pint of the discharges, mix it well and allow the mixture to stand for five minutes before emptying.

The giving of medicine in this fever ought to be under a doctor's care, and there are so many possible complications that may arise that it is always wise to have a physician in charge of the case.

TYPHUS FEVER.

Symptoms.—This is sometimes called camp fever. It is a well-recognized form of disease, running a definite course, and is due to a special infective poison. Its onset is shorter and more severe than that of typhoid. There is severe pain in the head and back, the former is often retracted in the same way that it is in meningitis. The skin becomes a dusky red and about the sixth day a distinct papular eruption appears.

MEASLES OR RUBEOLA.

This disease is marked at the outset by redness of the eyes and free flow of mucus from the nose. There is usually some sore throat and slight cough, but the throat trouble is not as severe as in scarlet fever.

Treatment.—1. When the above signs appear begin the treatment by bathing the feet in hot water for half an hour; then place the patient in bed and give frequent doses of an infusion or tea made of lobelia and asclepias leaves, equal parts of each. This should be stopped as soon as there is produced any tendency to vomit. Such treatment favors the outbreak of the eruption. After it is fully out continue the same medicine but in smaller doses to relieve cough and quiet any lung symptoms which may be present. Plenty of water should be given and a liquid diet.

2. When the fever is high sponging with tepid water is very soothing and will often quiet a restless patient and produce sleep.

3. For troublesome cough an infusion or tea made from the ordinary red clover hay will be found very useful.

Accessory Treatment.—1. When the chest symptoms are bad a tent may be made over the bed and steam passed under it from a kettle, the water in which has a teaspoonful of the tincture of lobelia to each pint. A cloth spread with carbolized vaseline may be placed on the chest to aid in soothing the symptoms in that region.

2. Care should be taken to protect the patient from danger of taking fresh cold during at least two weeks after all the fever is gone. If care is not exercised in this regard chronic nasal catarrh may result. See that the clothing is sufficiently warm and that the feet are kept dry.

Treatment in Severe Cases.—1. Whenever a case of measles is apparently severe at the outset, the treatment should begin with the following:

Tincture of belladonna	20 drops
Tincture of aconite	15 drops
Water	4 ounces

Mix and give a teaspoonful every hour until the skin is relaxed and the pulse less strong.

2. Whenever the eruption is delayed a wet pack will usually bring it out. If this cannot be given an emetic of salt or mustard water will be found effective.

3. For very severe cough following or even during the attack a teaspoonful of the tincture of drosera in a wineglassful of water every four hours will afford great relief.

SCARLET FEVER OR SCARLATINA.

Treatment.—1. The sooner the eruption appears the shorter the disease; treatment therefore should first be directed toward that end. We accordingly begin at once with the following:

Tincture of aconite	15 drops
Tincture of belladonna	20 drops
Water	4 ounces

Mix and give a teaspoonful every hour.

2. Bathe the body frequently in water in which a little soda has been dissolved. These measures will hasten the appearance of the eruption and can be gradually decreased as the fever subsides.

3. For the throat conditions the fumes from vinegar and water (one part of the former to three of the latter) will be found useful. Also a flannel soaked in equal parts of vinegar and water should be bound around the throat and renewed every hour or half hour during the worst part of the attack and then gradually discontinued as the trouble subsides.

4. In the early stages of very severe cases veratrum may be substituted for aconite in the prescription given above. If the nervous system is much affected replace the belladonna by gelsemium. When the glands of the neck swell badly the following preparation may be painted on the outside every four hours:

Tincture of lobelia	2 ounces
Tincture of aconite	½ ounce
Tincture of arnica	½ ounce

Or, make a poultice of wheat-bran and a strong tea of lobelia and apply it to the neck. One of the best gargles for patients old enough to use this method is made by adding one-half a teaspoonful of permanganate of potassium to a pint of water.

CHICKEN-POX OR VARICELLA.

Treatment.—1. Give a sponge bath followed by a hot foot-bath and hot drinks until sweating follows. If the bowels are costive it would be well to give a dose of castor oil or a seidlitz powder at the very outset.

2. If the fever is high give the following:

Tincture of veratrum	10 drops
Tincture of asclepias	½ ounce
Water	3 ounces

Mix and give a teaspoonful every hour to a child five or six years old.

3. For itching of the skin bathe with the following:

Glycerine	5 ounces
Rose water	5 ounces
Subnitrate of bismuth	30 grains

DIPHTHERIA.

Treatment.—1. First give an emetic if the attack is severe; if not, use the prescription with aconite given under the head of Measles and add veratrum if the fever is high. In the latter condition also we should use the general bath in addition to the hot foot-bath. The bath may be made more effective by adding salt or pepper or mustard to the water. If the feet become cold at any time a hot mustard foot-bath may be used.

2. For the sore throat give every hour a teaspoonful of the following:

Potassium chlorate	3 drachms
Water	4 ounces

If the mouth and throat remain dry use the following:

Dilute muriatic acid	½ ounce
Simple syrup	2 ounces

Mix and give a teaspoonful in water as a drink every two hours.

3. When the aconite has reduced the force of the disease so that the skin becomes soft and moist, stop it and give quinine, one grain every hour until the pulse is full and strong. If the patient is old enough to gargle any of the following may be used: Chlorate of potash ten grains to the ounce of water; infusion of baptisia; infusion of witch hazel; dilute tincture of phytolacca; or the solution of permanganate of potash thirty grains

to the pint of water. The last can be used as a spray or on cotton swabs. Use vinegar and water compresses to the outside of the neck constantly.

POISONOUS BITES AND STINGS.

Treatment.—Give aromatic spirits of ammonia in two-drachm doses in water every hour until reaction follows the shock. Strong coffee is also useful for the same purpose. Slices of raw onion may be bound on the point of injury or sting. Another very good external application is the permanganate of potash solution two drachms to the pint of water.

A COLD OR CORYZA.

Treatment.—Whenever a cold is suspected it may be broken up by giving a half drachm of the tincture of gelsemium and allowing the patient to sleep for a couple of hours. If this cannot be done give a hot mustard foot-bath, place the patient in bed and give hot drinks until a good sweat is secured. If more rapid means are desired give an emetic. Another good method is a wet sheet pack. Give a brisk purge in nearly all cases.

INFLUENZA.

Treatment.—Usually the plan just given for treating a cold will be found equally useful for influenza. If there is fever, or further treatment is needed, give teaspoonful doses of compound tincture of Virginia snake-root every two hours until the patient is well.

TONSILLITIS.

Treatment.—Use the following spray to the part during five minutes every four hours:

R.—Aconite tincture ..... 1 drachm
Water ..... ¼ pint

This will usually cut short the attack. Do not allow the patient to swallow the spray. If an atomizer cannot be had apply the medicine on cotton. Equal parts of vinegar and water may be used in place of the above. Apply on the outside flannels moistened with stillingia liniment. If the aconite spray does not cure in two days stop it and paint the tonsils with fluid extract of witch hazel.

ACUTE LARYNGITIS OR CROUP.

Treatment.—This may be the same as that just outlined for tonsillitis, but usually more active measures are needed. The hot foot-bath, steam inhalations and frequent small doses of tincture of lobelia or sanguinaria in simple syrup should be given until free sweating and flow of mucus occur. Prompt relief will then follow. Dry cups on the outside will be necessary in severe cases. A good free purge should always be secured early in the treatment.

ACUTE BRONCHITIS.

Treatment.—1. Begin the treatment by an emetic of lobelia or mustard water; after it acts give a purgative—the compound jalap powder or compound cathartic pill; follow that with a hot foot-bath and warm drinks until the patient sweats freely, then dry quickly and place in bed. If the attack is not completely averted by this treatment give the following until recovery is complete:

R.—Tincture of gelsemium ..... 1 ounce
Acetate of potash ..... ½ ounce
Water ..... up to 4 ounces
Mix and give a teaspoonful every two hours.

2. If a stronger expectorant or cough mixture is needed the following may answer:

R.—Syrup of lobelia ..... 2 ounces
Syrup of senega ..... 2 ounces
Syrup of althea ..... 2 ounces
Tincture of hyocyamus ..... ½ ounce
Mix and give a teaspoonful every two hours. (It is well to give quinine and iron as a tonic during convalescence.)

CHRONIC BRONCHITIS.

Treatment.—1. This is often the result of neglect in the course of an acute attack. Its treatment is therefore the same as that used in later stages of acute bronchitis. Cough is usually the most troublesome symptom, and the following mixtures have been found useful in combating it:

R.—Balsam of fir ..... 1 ounce
Balsam of tolu ..... 1 ounce
Balsam of peru ..... 1 ounce

Oil of anise ..... ½ drachm
Tincture of opium ..... 1 drachm
Honey ..... 2 ounces
Jamaica rum, to make one pint.

Mix, and take 1 or 2 teaspoonfuls every three or four hours. Shake well before using.

2. Or,

R.—Balsam of copaiba ..... 1 ounce
Balsam of fir ..... ½ ounce
Sweet spirits of nitre ..... ½ ounce
Honey ..... ½ ounce
Mucilage of acacia, to make 4 ounces.

Mix, and take a teaspoonful every four hours.

Inhalations of creosote are also useful—a drachm in a pint of boiling water three times a day.

ASTHMA.

Treatment.—1. Chronic cases have been cured by the following:

R.—Sulphur ..... ½ ounce
Bruised anise seed ..... 2½ drachms
Confection of senna ..... 6 drachms
Syrup of tolu ..... 6 drachms

Mix, and take freely every day; or, one or two teaspoonfuls three times a day, or sufficient to keep the bowels moving easily.

2. Or,

R.—Sulphur ..... ½ ounce
Anise seed ..... ½ ounce
Senna ..... 1 ounce
Cream of tartar ..... 1 ounce

Mix, and give a teaspoonful every night, or oftener if required.

Bathing and hygiene should be very carefully attended to.

WHOOPING-COUGH OR PERTUSSIS.

Treatment.—1. Begin with the following medicine as soon as the diagnosis is made:

R.—Fluid extract of belladonna ..... 10 drops
Alum ..... 1 drachm
Simple syrup ..... 4 ounces

Mix, and give a teaspoonful every three hours to a child two years old. The amount of belladonna in the prescription should be increased five drops for every added year of age in the patient.

2. Another good mixture is:

R.—Clover hay ..... 2 ounces
Boiling water ..... ½ pint

Mix and let stand for half an hour, then strain and add 1 ounce of sugar. Give 2 teaspoonfuls every three hours.

INTESTINAL WORMS.

Treatment.—To drive out stomach worms give five and a half grains of santonate of soda on two succeeding nights; follow on the second morning with sufficient compound jalap powder to give a free purge. Give tonics afterward and keep the bowels regular.

Pin Worms.—Keep the bowels regular and the person clean, also take daily injections of cold salt water in the strength of a tablespoonful of salt to the pint of water.

Tape Worms.—1. For tape worms give the following:

R.—Oil of turpentine ..... ½ ounce
Castor oil ..... 1 ounce
Honey ..... 1 ounce
Yolks of 3 eggs.

Beat the ingredients together and take it all, in divided doses during an hour, before retiring at night.

2. The ethereal oil of male fern is also an efficient remedy. The dose is from a half to one and a half drachms according to the age of the patient, given in milk or mucilage at night and followed in the morning by a purgative of compound jalap powder.

DYSENTERY.

Treatment.—Give the sulphate of magnesia in teaspoonful doses in as little water as will melt it every hour until the blood is stopped. Follow that by an astringent, or opium if there is pain. The subnitrate of bismuth will rapidly check the succeeding diarrhœa; give half a drachm every two hours until the bowels are checked. The patient should go without food for a day and then begin very cautiously with liquid diet and gradually increase until full diet is again reached.

MEDICAL SCHOOLS

PART VII.

JAPANESE CHARACTERISTICS AND THEIR VARIOUS DISEASES AND TREATMENTS.

THE SKIN.

The skin of the Japanese is of light yellow, which on the one hand transits into an European white, while on the other hand it goes down into deep yellow or light brown. Exceptionally, it is light bronze colored as if they came from Ceylon.

Skin of Upper Classes.—The people of the upper class are mostly lighter in color than those of the lower stratum. Some Japanese are not distinguishable from Caucasians in color, and apparently lighter than many of the Spaniards or Italians. The northern Japanese people are lighter in color than those of southern Japan, where they resemble somewhat the Malayans in color. Differences between sex is very slight. It is caused by the difference of the mode of life. Japanese men are more exposed to weather and sunshine than the women, half of whose lives are lived inside of the house.

Skin of Children.—Children are not lighter than the adults, and toward their teeth-changing age they become somewhat flushed with red color.

Babies.—A new-born baby is called *akambo* in Japanese, which means "red baby." It is remarkably red compared with that of the white race, but the redness does not continue longer than a few days after birth. Babies of higher class people are also lighter in color than the lower, while in other respects infants coming from robust mothers are frequently lightly rose-colored in the cheek, and are not as beautiful as the lighter child for European eyes.

THE CAUSE OF COLOR.

Skin Pigments.—The yellow color of the skin of Oriental people depends upon the presence of pigment particles within the skin stratum. So we find yellow or brown pigments in these people while it is black in the negro. But by careful examination of the lighter-colored skin of the Japanese there is a very small amount of pigment, though it may be larger in amount according to the intensity of the color. Of course the amount of the pigment found in Japanese differs only quantatively, not qualitatively. In children just born, or in fœtus, the distribution is very uneven and the amount is also scarce.

Japanese Ladies—(Upper Class.)

Mixed Breeds.—Mix breeds of European and Japanese are mostly very beautiful, their skin resembling north Europeans, or sometimes the inhabitants along Mediterranean Sea.

Japanese Lady—(Middle Class)

Skin of the Abdomen. — Local pigmentation is not without interest. The pigmentation of the middle line of the abdomen is oftentimes noticed in yet young maids who have no relation to pregnancy at all, whereas European women have it only during their pregnancy. In rare cases we meet with pigmentation of male subjects.

Nipples.—Nipples of unmarried girls are darker than those of the blonde European women, which in the latter must be gently rose-color before marriage.

Lips.—Lips and eye-balls are generally about the same as Europeans are, but sometimes there are some who have circumscribed blueish-grey coloration along the conjunction of external skin and mucous membrane.

Tatooing.—Beside these congenital characteristics, Japanese did tattooing in greater extent. But tattooing on the skin is not accepted by the higher class or educated people, it is controlled exclusively by the lower layer of the people, such as coolies or the same. Under the law these barbarous customs were already forbidden and now we see them very seldom among the old coolies.

CARE OF THE SKIN AMONG JAPANESE.

Japanese Cleanliness.—Japanese are strict lovers of individual cleanliness. Every family has a bathroom, whether in the city or the village cottage, from the wealthy to the poorer classes. Those who have no bathrooms of their own may find everywhere public baths, which are scattered throughout the cities or towns. These public baths stand under inspection of the sanitary police.

Daily Baths.—Above the middle-class people, Japanese take baths every day; even the laborers never omit baths over three days at longest.

Change of Clothing.—Underwear, stockings or other clothes are sent once a week to laundries, while well-to-do families take more frequent care of the clothing. Japanese women are more careful than the men, so if any woman omits a bath over two days she is spoken of as dirty by the others.

Bath Temperatures.—The temperature of the bath is generally very high in the city, while it is about the same as in other lands in the country.

THE HAIR.

Types of Hair.—Speaking generally, Japanese have the same features of hair as the other folks of the Malayo-Mongolian race. There are, however, at least two kinds of Japanese distinguishable by their hair, one is of the thin hair type, with long face; another is of the thick hair type, which reminds us of resemblance of the Albino race. In this latter type we observe pretty coarse hair on various parts of the body.

THE HAIR OF THE HEAD.

Color of Hair.—Development of hair of Japanese is thick and strong. The color of the hair is seemingly dark, but absolute black is very seldom seen. If we examine the hair carefully it is darkish-brown, or frequently red-brown; true blonde hair being seen rarely in the Japanese, it being somewhat abnormal, as the hair of the Albino is among Europeans.

Hair of Children.—The hair of children is far lighter in color than that of adults. Under four years the children rarely have dark hair.

Women's Hair.—The hair of women appears a more brilliant black than that of the men. The length of the hair is preserved pretty long, for æsthetic purposes, and some reaches to the heel, when they untie their pompadours. Japanese women's hair is generally straight. Curling is seldom seen. Japanese women detest curled hair, and unmarried girls are quite unhappy when they have curled hair.

THE BEARD.

The beard of the Japanese is very thin and scarce. It makes its appearance comparatively later in life than with the Europeans. The color is generally dark-brown to red-brown, and sometimes lighter brown.

CARE OF THE HAIR.

Pompadours.—No woman in the world, from admirable sòciety ladies to the negresses in a wild part of Africa; from ancient Egyptians to the present Hottentots, have failed to take care of their precious hair. So it is also the case with Japanese women. As you read and see, the Japanese women form very peculiar pompadours with great earnestness and skill.

Perfumes.—They use some perfuming oily materials to make the hair fragrant and brilliant.

Hats.—The European hat is never used by Japanese women. They use an oblong square piece of various cloth. In a short walk they use no cover except a handy parasol. On the other hand, most of the laboring class women use cloth covers over their heads.

NOSE AND EYES.

Nose Peculiarities.—One glance is enough to judge what nationality is in question, when anybody notices the nose and eyes of the Japanese. The difference of the nose of Japanese from Caucasian lies in the anatomical difference as to the attaching point of the root of the nose to the frontal bone. Where the Caucasian's stretches out directly from the same plain in front the Japanese nose starts from far deeper portion of the frontal bone. This peculiarity gives a further characteristic appearance to the face of disagreeable flatness. Exceptions to this common character are frequently seen.

The Eyes.—Japanese eyes are very different from those of the European, as the latter have the depression between the orbital arch and lid-rim, while the former lack this depression and have folds in the lid-rim and inner-angle of the eyes. The opening also is narrower in Japanese. All these differences depend upon the position of the eye-balls. The European has eye-balls situated more forward.

Color of the Eyes.—Japanese have dark eyes; among one hundred, ninety-five being brown, five black. But in Japan true black eyes are rarer than in Southern Europe. New-born infants have bluish-black to greenish-black colored eyes, which after several months become gradually a brown color.

Eyebrows generally grow very thick and broad and of black color.

Ears.—Ears are not built shapely in many cases as we notice in Europeans.

Cheek.—The cheek is also pretty prominent, which represents an Asiatic characteristic. This is only remarkable in one type of Japanese; while in another the long-faced type is not much noticeable.

MOUTH AND TEETH.

The mouth of fine type is usually small, and the lips fasten shapely; while the lower type has a comparatively wider opening, which is disagreeable to look at. Teeth are of good quality when grown normally. In the lower class, however, there is a more prognatic mouth, owing apparently to the ignorance about the proper care of the children during their second dentition. Dental diseases seem to be rarer than in this country. Oral hygiene is regarded as important by the Japanese, and children are taught to get a regular habit of cleaning the mouth at home as well as at school.

INFECTIOUS DISEASES.

Measles (Mashin or Hashika).—Preventive measures are taken strictly. Isolation of the sick children from healthy. When one of a family falls a victim, all dejecta of the sick child is mixed with antiseptica, such as five per cent. carbolic acid, or one one-thousandth corrosive sublimate lotion, and so forth. For the disease itself, baths, packs—especially carbol ointment, milk, eggs, expectorants and sometimes antipyretics.

Scarlet Fever (Shiokownetz).—Preventive measures are the same in all infectious cases. Baths, douches, packs, gargles, lemonade, stimulants and symptomatics. In Japan no epidemic of this disease has been experi-

enced, and I have treated only one case. Some authors believe that Japanese are immune to scarlatina.

Small-Pox (Howsow).—Before the introduction of Jenner's vaccination, small-pox was regarded as if a life-tax which everybody born in Japan must pay once in a lifetime.

Vaccination.—Since vaccination has been imported people believe in it unanimously, and thirty years ago the government put forth vaccination laws. It is compulsory every three or seven years. The treatment is by baths, symptomatics, stimulants, prophylactics.

Chicken-Pow (Futow).—Children suffer only slightly, and unless complications follow the physician is not usually called in. But medical officers of health notify the case.

Mumps (Zikasenin).—Generally mercuric ointment rubbing is enough. If the case is grave, the leech, purgatives, light diet and incision are resorted to.

Whooping-Cough (Hiakunichigai).—Isolation of children from patient. Change of air; much out-of-door life; moist packs; cold ablution. Each fit attended with vomiting should be followed immediately by the administration of nourishment (milk, egg, broth, and so forth). Bromoform from three to ten drops, sometimes beneficial. Internally, some narcotics, such as bromide or belladonna. There are many children who become true patients from imitating their comrade-patients. Parents lack care when such a comic accident occurs.

Cholera Nostra (Kakuran).—This is much dreaded by parents, and also in adults in the summer months.

Treatment.—Opium, calomel, bismuth, astringent wine, soup, poultices, stimulants.

Dysentery (Sekiri).—Japan was losing her inhabitants at a dreadful rate annually, and the cause was discovered by Dr. Shiga, who started his serum-therapy treatment about three years ago in behalf of the government. The result of this special treatment decidedly diminished the mortality. Dr. Flexner, professor in University of Pennsylvania, discovered the same cause in his expedition to the Philippines.

General Treatment.—Besides this special treatment, castor-oil, calomel, opium, suppositories, saline infusions, mucilaginous enemata, concentrated liquid diet, stimulants, hot packs, isolation, notification, disinfection, and so forth.

Canine Rabies (Kiokenbio).—Preventive inoculation, or commonly

spoken of as Pasteur's treatment. Cauterization of wound, narcotics (chloral, morphine), stimulants.

The Plague (Pest or Kokushibio).—The recent invasion of plague gave Japan a severe blow, and government as well as people were in utmost alarm, and every effort was made to subdue this obstinate disease. At present no case in Japan. The preventive measure is very strict; burning down infected places, ships and trains quarantined, house-hunting and arrests in suspicious cases.

Special Treatment.—For special treatment, Yersin's healing and preventive inoculation; Kitasato's serum therapy; Oiher's symptomatic treatments.

Yellow Fever (Ohnetz).—No cases in Japan.

The Rheumatic Diseases (Riumatisu).—Salicylic acid and its salts, salophen, salol, colchicum. Wet packs, baths (iodine, bog-mud), massage, and so forth.

Croupous Pneumonia (Haiin).—Ice-bag, cold drinks; diet with milk and eggs; cold packs, mustard-plaster, digitalis and stimulants.

Epidemic Cerebro-Spinal Meningitis (Riu-kow-sei Now-sekizuimaku-in).—Occurs seldom in Japan.

Treatment.—Rest, cold pack, ice-bag, blood-letting from mastoid region, calomel, cantharoidal blister to the nape of the neck, mercurial inunction, antipyretica and narcotica.

Erysipelas (Tandoku).—Serum therapy in first place, and then ordinary symptomatic treatments, such as poultices, sustained nourishment, cold baths, stimulants, injection of 3 per cent. carbolic acid to surrounding inflammation.

Relapsing Fever (Kaikinetz).—Quinine or other antipyretica stimulants and tonics. This disease was introduced by soldiers at the end of China-Japanese war, but no cases at present.

Malarial Fever (Kwanketsunetz).—Quinine sulphate in various doses before the expected attack—usually six hours. In protracted cases, arsenic and iron administered, and baths directed.

TUBERCULOUS DISEASES (Kekkaku-bio).

Pulmonary Tuberculosis (Hai-kekkaku).—Digestible diet (milk chiefly recommended, eggs, solf-boiled rice, cod-liver oil, young poultry), cool rubbing of skin, open-air life, country residence, treatment in sanatorium; arsenic, creosote, guayocole, myrtol, solveol, and so forth; mineral waters.

Expectorants (pectoral tea, senega, apomorphine, chloride, and so forth). For cough—codeine, opium, belladonna, morphine. For night-sweats—atropine, agaricine, and so forth. For hemorrhages—rest, ergotine, morphine, ice-bag, lead acetate. For marasmic fever—antipyretics. Individual spittoon, disinfection of linens, encouragement of the patient.

Sanatorium Treatment.—Beside these ordinary treatments in Japan a special serum therapy is in popular favor, or new-tuberculin injection in sanatorium, where patients are provided with free air, sports in various styles and medical attendance.

Glandular Tuberculosis (Rui reki).—Cod-liver oil with lime, iron, iodide, arsenic, nutrition; sometimes surgical operation. Japanese believe that glandular tuberculosis is a forerunner of pulmonal tuberculosis, and they come to get it extirpated by surgeon.

Intestinal Tuberculosis (Cho kekkaku).—Opium, poultices, bismuth, astringents, mucilaginous drinks, decoction of salep or colombo.

Tuberculous Peritonitis (Fukumaku-kekkaku).—Beside symptomatic treatments, laparotomy undertaken with brilliant results.

Typhoid Fever (Chotyphus).—Serum therapy is used as a special remedy with good results. Diet: milk, broth, eggs, beef juice or chicken. Calomel at onset. Cold baths at 20 degrees Centigrade, and antipyretica in febrile stage. Later, digitalis and stimulants. Prevent bed-sores by alcoholic applications or air bed.

Diphtheria and Croup (Dixteria Croopu).—Serum therapy in every case. As other methods for preventing complications, gargle or inhalation of dilute solution of carbolic acid (rarely used), iced milk, stimulants. In suffocating stakes, emetics, intubation or tracheotomy. In such grave cases combination of antitoxin serum and surgical operation are preferred.

Grippe (Riu kow sei Kanbo).—Isolation and disinfection of the patients, but in widespread epidemic these preventive measures are scarcely to be carried out. For patient, rest in bed, good ventilation, lightly digestible food and medicaments. Among medicines, chinine is very effective, or antipyrine and salicylic acid are recommended for fever. Expectorants, gargles and stimulants according to the condition of the patient.

Asiatic Cholera (Kolera).—Strict quarantine and disinfection. Cholera cadavers always cremated.

Serum therapy against cholera was and is used by government institute, but we have not many cases to determine its real value. Calomel,

opium, ice-pills, hot-packs, stimulants, infusion of saline solution are symptomatic medicines.

Leprosy (Rai-bio).—Preventive measure is the most important, inasmuch as we have no special treatment. In a plain, near Mountain Fuji, there is one lepra village under government expense, where any patient who desires to spend his poor life apart from the community is allowed to live, furnished with necessary staffs.

Among medicaments for leprosy, natrium salicylicum has good reputation and ointments of ichthyol, aristol and hydroxylamin are recommended.

Gonorrhea (Rinbio).—As preventive measure, strict inspection of public girls thrice a month by sanitary inspectors. Some use condoms and wash local part with 2 per cent. carbolic acid, after intercourse.

Medicinal Treatment.—Among medicines, sulphate of zinc followed by iodoform is most used; garbolmol came in general use quite recently. Internally, balsamum copaivæ (0.6 in gelatine capsule, five to ten times a day), balsamum peruvianum, balsamum tolutanum, oleum terbenthinæ, fructus cubebæ, and so forth. Dietary care is very important, as light coffee, milk, tea, avoiding strong coffee, tea or spices. Patient must be confined to bed, no speaking, no pictures which may cause sexual excitement; against erection and pollution; early supper, many hours before sleep, and a pulver consisting of bromide potash, lupulin and camphor.

For annoying urination (repeated in short time) suppositories of opium or morphine used (but not belladonna).

For chronic gonorrhea we decline to meet urethral strictures, which want bougie treatment or surgical operation.

Tetanus (Hashofu).—Serum therapy used in general. Beside thorough incision and washing of the infected wound, if discovered. Among symptomatic remedies narcotics are the only medicines to lessen patient's trouble.

Chancre (Nansei-gekan).—When ulcers appear many abortive treatments offered, such as washing with concentrated nitrate silver, sulphate zinc, caustic potash, caustic paste or galvanic cauterization.

After these methods, application of thin layer of iodoform, aristol, calomel, bismuth, dermatol or europhine, and covered with fat-free cotton moistened with carbol vaseline. Liquors avoided as well as sexual intercourse. For complications, often surgical treatment wanted.

Syphilis (Baidoku) or Acquired Syphilis (Kowten baidoku).—Prophylaxis, being the same as gonorrhea. When syphilitic patients may marry.

It is considered as harmless if they marry after three years from their first infection. But this, of course, depends upon the patients, whether they had taken proper antisyphilitic treatment during that period or not. After marriage, they should consult physicians every two or three weeks for first six months whether any sign of return appears or not.

Syphilitic Stages.—If a man is infected with syphilis, the first symptom is hard chancre, which wants mercury treatment. From this primary stage to secondary period mercury cure is the chief treatment. The patient is forbidden to indulge in *baccho et venere* during this treatment. Cold is harmful for the patient taking inunction cure, so cold baths or douches not allowed. Dietary care is also important. Some physicians recommend combination of inunction and internal administration of iodide potash. For the broad condylomata on the external skin, washing with saline solution and calomel pulverization proves beneficial. When recidicive occurs, sometimes condylomatous eruptions appear in mouth. In such case internal use of mercuric preparation is prescribed.

Third Stage of Syphilis.—When syphilis proceeds to the third stage, iodide of potash is prescribed as a special remedy. By this treatment, if patient be persevering enough to maintain full effect, almost all of the syphilitic symptoms disappear.

Iodo preparations combined with iron serve as an effective remedy against subsequent cachexia and amyloid degeneration. Mineral baths (sulphur) are recommended also. Sometimes subcutaneous injections of mercuric preparations are directed.

If gummata affects various parts they are treated surgically.

Nose Syphilis.—When syphilis is located at nose, mercuric plaster is used for ulcerative part of skin. For the destruction of internal part of nose, we treat it with nose-douche, washing with carbolic acid (2 per cent.), corrosive sublimate or thymol, followed by snuffing of calomel or iodoform. After the destructive process ceases to progress, the deformation is repaired by a plastic operation.

Other Syphilitic Forms.—Other forms of syphilis are treated under general antisyphilitic remedies and special methods according to the location.

For syphilitic affection of nervous system, electricity or massages are recommended sometimes beside general antisyphilitic cure.

Hereditary Syphilis (Senten baidoku).—Prophylactic measures are most important, so nobody should marry within the course of three years after infected with syphilis. If a woman becomes infected with syphilis

during her pregnancy, a strict antisyphilitic remedy must be taken. If it was in the course of the latter half of pregnancy, the baby is expected to be born healthy. But in such a case, the baby is to be nourished with cow-milk or by a wet-nurse exclusively. But if syphilis had rooted deep in the parent before pregnancy, the baby also inherits the formidable virus with its life, and then the baby is preferably nourished with its mother's milk. But the mother is treated with iodide potash in order that the specific medicine may be secreted through mammalian glands into the milk. For the disease itself, use mercuric pills in favorable forms for the stomach.

Treatment of Mothers.—During treatment the mother should take care of cleaning oral cavity every day. Bath containing corrosive sublimate (3.0), 28 degrees Réaumur, is directed every day. In my country the bathtub is made of wood generally, and it suits for the use of mercury bath.

DISEASES OF RESPIRATORY ORGANS.

Laryngeal Catarrh (Kowtow katarrh).—Priesneitz's pack around neck, hot milk, codeine for acute. Inhalation of saline water, tannin-alum solution; painting with nitrate silver (3-10 per cent.) for chronic. Baths are not recommended much.

Bronchitis (Kikwanshi katarrh).—For acute form, mineral water, milk and tea, wet packing, warm baths, codeine, expectorants. For chronic form, marine life or warm southern climate, wet packs, rubbing skin, expectorants. Inhalation of mineral water is especially recommended.

Asthma (Zensoku).—Treatment of eventual nose diseases, marine life. In paroxymata, iodide potash, morphine, inhalation of pyridin vapor, and so forth.

Pulmonal Emphysemata (Haikishi).—About same as asthma or bronchial catarrh. Iodide potash or digitalis, gymnastics of lungs, pneumatic chamber, compression of thorax, and so forth.

Pleurisy (Kiomaku-irr).—If the quantity of exudate reaches up to second intercostal space soon, it is drawn by puncture. But there must be several pauses during the whole operation, as it will cause cerebral anemia from sudden loss of blood-pressure. Before and after treatment of the operation must be strictly aseptical. Besides, contra-irritation, wet pack, ice-bag, diuretics, anti-rheumatics and morphine.

DISEASES OF CIRCULATORY ORGANS.

Endocarditis (Shinzonaimakuin).—Rest, ice-bag, salicylic preparation or eventually digitalis, strophantus.

Cardiac Insufficiency (Shinzo-benmaku-heisafuzen).—Digitalis infusion (0.8—1.2/00) is the chief remedy in meeting the disturbance. Other auxiliary medicaments are diuretics, stimulants, morphine.

For the hydropsy from heart disease: Calomel combined with digitalis, taking care of stomatitis at the same time. Then the diuretics such as acetate potash, diuretics, scilla, tartarus boraxatus, and so forth.

Treatment by Massage.—Massage, high position and enveloping of the swollen parts is recommended. Puncture for strong hydropsy is rare. During compensated stage care is directed not to use strong body moving or alcoholic beverages, while patient should take nourishing, assimilable food. Bath-cure (cold baths) is also advisable.

Nervous Palpitation (Shinkeisei Shinki-kowshin).—First affair is to improve patient's general condition; iron, quinine or strengthening diet for anemic subjects, while bitter waters or bath-cure prescribed for the full-blooded. Among internal remedies nervines or sometimes narcotics are used. Cold compression and ice-bags often act beneficially.

Angina Pectoris (Kyoshinsho).—Irritation of skin (mustard), application of hot or cold compression, morphine injection and other narcotics such as chloralamid, nitro-glycerine, and so forth.

Pericarditis (Shinnow-in).—Quiet, rest, digitalis, strophantus, ice bag or mustard-paste. In large exudate, puncture with aspirator; in pus accumulation, surgical operation.

Aneurism of Aorta (Daidowmyakuriu).—Iodide of potassium, ergotine, compression, electric cauterization, and so forth. But no remedy proves effective.

DISEASES OF DIGESTIVE ORGANS.

Inflammation of the Mouth (Konai-iu).—Including various forms of stomatitis. Cleanliness, care of gums; gargle with tannin, alum, borax, and so forth, according to the condition, antiseptics also used such as hypermanganate of potassium (0.1 per cent.), chloro-potash (2 per cent.), hydrogen dioxide solution (2 per cent.), tincture myrrh, tincture ratani, or lapis cauterization in grave cases.

Acute and Chronic Gastric Catarrh (Kuisei and Mansei-I-katarrh).—Treatment of the acute same as here. For chronic forms it depends upon

the nature of the causal diseases. At first, treatment of causal diseases; regular dietary, avoiding fatty indigestible foods. Sometimes cold rubbing upon the stomach region, massage over stomach, regular evacuation (using oil or glycerine enema), sea-water baths, hot spring cures.

Gastric Ulcer (I-kwaiyo).—Bed-rest, warm poultice applied intermittently, fluid diet (milk, eggs, soups). Internally, administer sodium bicarbonate with bismuth, the latter used alone in large doses in some cases.

Cancer of the Stomach (I-gan).—Internally, only symptomatics, sometimes hydrochloric acid and extract of condurango used with good results. Eventually, when the cancer is located near the pylorus it is removed by surgical operation.

Dilatation of the Stomach (I-kakucho).—Regular washing of the stomach in evening daily; massages, electricity; cold rubbing over gastric region. Fluid diet, regular evacuation with purgatives or enema, morphine, chloral hydrate, and so forth. Surgically, early extirpation of the tumor.

Nervous Dyspepsia (Shinkeisei-shokafurio).—Cold rubbing, strengthening diet, massage, electricity, baths and mental therapy.

Intestinal Catarrh (Chokatarrh).—Dietary regulation, opium and tannin, tannigen, and so forth. For acute form, artificial Carlsbad salt, packs, massage, digestible food and regular evacuation. Alcoholic liquors forbidden.

PARASITES OF THE INTESTINES (CHOKISEICHIU).

1. **Tape-Worm.**—Extract filic maris 2.0 in capsules (in 5-6 pieces) taken in one-half hour. Three hours later one spoonful of castor oil given. Sometimes we use thymol, one-half grain, instead of extract filic, as the latter may eventually cause amourosis. Chloroform is also used with success.

2. **Ascarides (Round Worm).**—Santonin, one grain several times a day.

3. **Oxyuris (Seat Worm).**—Naphthalin, 4 x 0.15—0.4; castor oil or calomel.

Ascites (Fukusui).—Treatment of causal diseases, digitalis, diuretics, calomel, puncture.

Jaundice (Oudan).—Artificial Carlsbad; dietary direction; no fat stuffs.

Biliary Calculi (Tanaeki).—For paroxysm apply cataplasm, narcotics internally or hypodermically. Carlsbad-cure, salicyclic and bicarbonate sodium given later.

SOME HINTS FROM JAPANESE TREATMENT

Taking the Pulse.—The little finger can be used in taking a delicate pulse when it would be impossible to readily recognize it with the fingers ordinarily used.

Curing Convulsions.—Convulsions may be frequently cut short like magic by turning the patient on his left side.

Increasing Warmth.—When chilly from exposure breathe very deeply and rapidly, and the increase in bodily warmth will be surprising.

A Cure for Burns.—Crude petroleum poured upon a burned surface and covered loosely with cotton will subdue the pain almost at once.

Poisonous Wounds.—Strong spirits of ammonia applied to the wounds of snake bites or rabid animals is better than caustic. It neutralizes the poison.

Carbolic Acid Poisoning.—Carbolic acid poisoning can be quickly cured by giving cider vinegar diluted with equal parts of water in half tumblerful doses every five or ten minutes for a few times.

Morphine Poison.—Permanganate of potash is an efficient antidote if taken while morphine is in the stomach. Grain for grain will completely decompose it.

Infantile Colic.—A towel dipped in boiling water, wrung out rapidly, folded to proper size and applied to the abdomen, with a dry flannel over the hot towel, acts like magic in infantile colic.

Pregnancy Nausea.—Vomiting and nausea of pregnancy, a 20 per cent. solution of menthol in sweet oil; use ten drops on sugar when nausea appears.

Rheumatic Joints.—Wrap a swollen rheumatic joint in cloths wrung out of ice water and the pain will almost instantly cease.

Snake Bites.—Saltpetre is a specific for snake bites. The dose is a teaspoonful for a child and a tablespoonful for an adult in a glass of cold water, applying it also to the bite.

Cure of Opium Habit.—The most effective treatment and cure of the opium habit consists of the administration of bromide of soda. The drug is given one drachm every two hours for the first two days and one-half drachm on the third day. Two ounces seldom fail to effect a cure. See index.

MEDICAL SCHOOLS

PART VIII.

GERMAN HOME MEDICAL TREATMENT.

The Kneipp Cure.—Natural healing has been developed in Germany mainly by Priessnitz, Schroth, Kneipp, Kuhne, Bilz and others, a feature common to all their cures being the extended application of water. Especially the Kneipp cure has found in recent years a great many friends.

Principles of the Kneipp Cure.—The principal remedy is cold water. Regarding its judicious application the following general rules may be given:

1. The shorter the bath or the application of water, the better the result.

2. The colder the water, the shorter must be the bath and the quicker results the wholesome reaction in the body. Weak persons ought to begin, however, with mild temperatures, say, first 60 degrees (Fahrenheit), later 55 to 50 degrees and finally cold water.

3. Before the application of the cold water is made the body should be as warm as possible; otherwise one must begin with a warm water treatment.

4. When the application of the water has been made, do not dry the body, but dress yourself quickly and make first quick movements and then slower ones, in order to produce the reaction in the body. Should the reaction not set in and the patient be very weak, he should go to bed to get warm.

5. Hardening the body is the best means against all diseases. Nothing is better for this purpose than cold water.

Kneipp Knee Shower-bath.—With a hose sprinkle cold water on the leg of the patient, from the foot to the knee. Begin with the front of the leg; start with the right foot; go up to the knee and then back to the right foot; go then over to the left foot, up to left knee and back; do this until the legs become red. Then turn the patient and treat in the same way the back part of the legs.

The knee shower is applied mainly against rush of blood to the head; to make the blood circulate from the head to the lower parts of the body.

The Kneipp Head Shower-bath.—The whole head is uniformly sprinkled over with water by means of a sprinkling can; one sprinkling can full of water is sufficient. For weak persons take the can only one-half full. The head shower-bath is applied with success, especially against diseases of the eyes, ears, nose and head. Take care to dry the hair carefully after the bath.

Walk Barefoot in the Damp Grass.—Besides the regular baths of the whole body or of parts of the body, this is the most simple and natural means of hardening the body. Persons who suffer with rush of blood to the head or with diseases of eyes, ears, throat and nose, ought to walk daily barefoot in the damp grass for ten to twenty minutes with excellent success if the weather is not too cold.

Natural Healing in Special Diseases.—Special applications of the Kneipp cure in different cases will be found in the following articles on special diseases, in which also the methods of treatment of other German representatives of natural healing are considered.

CHICKEN-POX.

Treatment.—Keep the body warm, take good care of the skin by taking daily a full or three-quarter full bed steam bath (see the description below). After the bed steam bath take a bath of 86 degrees Fahrenheit, or rub the whole body with water of 72 degrees. The inflamed portions of the skin may be powdered now and then with rice-flour. Avoid stimulating food, go much into the fresh air, and if necessary use a syringe when bowels are constipated.

The Bed Steam Bath.—This bath may be taken in two forms: either as a full bath or as a three-quarter bath. In the full bath the body is wrapped up to the chin, in the three-quarter bath the arms are free. The method of wrapping up the body is the same in both cases. The wraps are a woolen blanket, and a damp linen cloth, which has been put into water between 64 and 77 degrees and has then been wrung out. The woolen blanket must be larger than the damp linen cloth. Put the woolen blanket first into the bed on the mattress, put the damp linen cloth above the blanket, put the entirely nude patient above that and then wrap him up. The patient must be covered entirely by the damp linen cloth, and this must be again wrapped up in the woolen blanket, so that at the outside there is nothing but the woolen blanket. Hot water bags may often be used to advantage in connection with this bath; four bags may be applied:

one at the bend of the knee, the second at the soles of the feet, and the other two at both sides of the legs, outside of the wrapping. Sometimes the two bags alone are sufficient.

These baths are not only good against chicken-pox, but may be applied also in other diseases, as will be noticed in the following articles.

WORMS.

Treatment.—Avoid irritating food. The best food is bruised wheat-bread, pumpernickel, fruits, figs and carrots. Place every night, or every second night, a bandage around the abdomen at 77 degrees (see the description below), and rub the whole body in the morning with water of 55 degrees. If necessary, use a small syringe twice daily to make the bowels move; use water of 77 degrees.

Kneipp's Worm Remedy.—Kneipp recommends the following remedy against worms: Mix wermuth with twenty-five ground seeds of pumpkins, and drink this tea for several weeks, and the worms, which cannot stand the bitter tea, will soon disappear.

The Bandage Around the Abdomen.—This bandage is not only useful for the above purpose, but is somewhat like a universal remedy; it acts often in an admirable manner; it renders very good service against cold in the head, headache, toothache, loss of appetite, dizziness, etc.; it is especially useful against female ailments.

How to Apply the Bandage.—There are required for this bandage some woolen cloth or a long woolen shawl or a piece of flannel of sufficient length and width to make a bandage twice around the abdomen. There are further required two towels of coarse linen, which are put into water between 66 and 75 degrees, and are then thoroughly wrung out. These towels are placed upon the flannel or woolen bandages, which are spread out ready for use. The flannel or woolen bandages must be larger than the towels, so that the flannel or wool have to show from either side the width of two or three fingers. The bandage, fixed in this way, is then placed around the abdomen of the patient.

BRIGHT'S DISEASE.

Treatment of Acute Form.—Take daily a bed steam bath (see the description in the article on chicken-pox), with extra bandages at the back in the neighborhood of the kidneys, also extra bandages on the heart,

until perspiration takes place freely; after that take a bath of 88 to 90 degrees, and a shower-bath with the water of 81 to 84 degrees, and rub the skin thoroughly. If necessary, extra bandages of shorter duration may be made on the kidneys, around the legs, and so forth, also during the night. Patients who do not stand well the bed steam baths should be treated by mildly washing and rubbing the whole body several times daily. Avoid irritating food; don't drink much. The best to drink is milk which is not too cold; strictly avoid all alcoholic drinks. Take care that the bowels move regularly; if necessary use a syringe; go much into the fresh air. Improvement can be obtained by this treatment in one or two weeks, but sometimes it takes several months, until the urine becomes clearer and lighter and begins to flow in greater quantities.

Treatment of Chronic Form.—The chronic form develops itself from the acute form; [illegible] patient is not aware of the development itself until the disease is in a critical state: Take daily a bed-steam-bath, after that a bath of 88 degrees or warmer, say 61 to 63 degrees, for eight to ten minutes. Bandages may also be applied during the night. Avoid irritating food; take much sweet milk. Drink water in moderate quantities, take care that the bowels move regularly. Above all, rest in the bed.

Kneipp's Cure.—Against Bright's disease Kneipp warmly recommends lemon juice. According to Dr. Siebert one patient ate in three months three hundred lemons, daily three or four, and the urine was free of glair. The patient was dismissed as cured. Kneipp's baths must be of course also applied in connection with the treatment.

ITCH.

Treatment.—Separate the sick person from the healthy people, because this disease is contagious. Give the patient a steam-bath of 15 to 25 minutes, and after that let him take a bath in a bathtub at 97 to 104 degrees, for ten to fifteen minutes; rub the body thoroughly with soft soap, to which may be added some sand in order to scratch the itchy spots open. After the bath, rub soft soap thoroughly in the itchy spots (without sand) and give the patient a "dry-wrapping" (see description below) for three-quarters of an hour to an hour. Finally let the patient take a cleansing bath at 88 degrees. Repeat this treatment daily for four to five days. Let the patient change the underwear every day. One may also leave out the steam-bath and begin at once with the warm bath. One may also rub the itchy spots with kerosene before retiring in the evening;

when rising in the morning let him take a bath and clean the body with soap. Repeat this treatment for three or four days.

Description of the Dry-Wrapping.—Place on the mattress a large woolen cloth and above that a large linen bed-spread, put the patient on these cloths and wrap the same around him, first the linen bed-spread and around that the woolen cloth; wrap the bed-covers (the blankets) around and tuck them in all about so that no air can come through, and the heat which is developed inside cannot escape. The patient will soon begin to perspire.

The dry-wrapping is of great value for the most chronical diseases, but may in single cases be of advantage. One should always observe whether a patient stands better a dry-wrapping or a bed-steam-bath (see the description of the latter in the above article on chicken-pox) and one should choose what is more advantageous to him.

CANCER.

Treatment.—The prospect of a thorough recovery of the patient is not very great. To produce relief, give the patient daily a warm bath of 59 to 61 degrees, and sprinkle softly the sick portions of the body; further avoid all irritating food, use a diet without any meat (among the original inhabitants of the East Indies, who are vegetarians, and live on vegetables and fruits, the disease of cancer is entirely unknown); finally let the patient go much into the fresh air and let him sleep at open windows.

The cancerous spots of the body should often be cleansed by rinsing them with clean water or with decoctions of camomile; also soothing or exciting bandages (see the descriptions below) should be applied. During the first period of the disease let the patient take weekly three or four full steam-baths following with full-wrapping baths and baths in the bath-tub with shower-baths; or, instead of that full bed-steam baths (see the description in the above article on chicken-pox) with following bath. Sometimes it is of advantage to apply daily warm compresses on the sick spots, which are afterward sprinkled softly with water of 81 to 86 degrees and are then covered with a compress, moistened with water of the same temperature.

Description of Soothing and Exciting Bandages.—Both bandages are applied only at special sick portions of the body, that is on the cancerous spots. An "exciting" bandage heats the sick portion of the body and dissolves and diverts the disease. It is applied in the following manner.

Dip a piece of linen into cold water of 64 to 73 degrees, wring it out and place it in two, four, six or more layers on the sick spot; place above it a thick dry woolen patch which must be larger on all sides than the moist linen. This compress must be tight and well fixed so that the heat formed below it cannot escape; the compress must be larger than the sick spot on all sides by several inches. This compress is left on the sick spot for two, three or four hours, or for the whole night; in general as long as the patient does not want it removed; it should not annoy the patient. After the compress has been removed sprinkle the sick spot with cold water.

The Soothing Bandage.—A "soothing" bandage is applied for relieving the pain. A piece of rough linen, folded up in four to eight layers, is dipped into water of 77 to 86 degrees, slightly wrung out, placed on the sick portion of the body and covered with a woolen patch. This compress is mostly applied for 30 to 45 minutes and in general as long as they produce agreeable feelings to the patient.

CATARRH.

Treatment.—The first point to aim at must be to remove the special causes to which the increased separation of phlegm is due. Avoid irritating food, rub the whole body daily with water of 73 to 77 degrees, or take a bath of 88 to 91 degrees, after which the body must be thoroughly rubbed until it is dry. During the night a bandage around the abdomen (see description in the above article on worms) is to be applied. Further different forms of wrappings, bandages and bed-steam-baths are often advantageous. Keep quiet and rest. When the organs of breathing are affected, keep the body uniformly warm, and breathe mild, clean air which is not too dry. Take care that the bowels move daily. As the different forms of catarrh are produced by different causes, they must be also treated in a different way, and the treatment should always be of such a kind that it suits the special patient. The above remarks give the general rules.

CHOLERA MORBUS.

Prevention of Cholera Morbus.—In case of epidemic cholera morbus in a town, everybody must take great care to keep his body in such a condition that it cannot be affected by the disease. The best means of accomplishing this are as follows:

The Blood.—Take care that your blood is good and healthy. For this purpose breathe good, clean air. Everybody who can afford it should be daily in the fresh air for some time; in the fresh air take repeatedly deep breaths. Air thoroughly the rooms where you live and sleep. If one is confined to the house and must breathe bad air, breathe through the nose and rinse afterward mouth and nose with fresh water and strengthen the lungs in the best air which is at disposal.

Diet.—Avoid irritating food, don't eat meat, don't drink alcoholic drinks, avoid spiced and sour dishes. When one does not want to avoid meat entirely (which would be the best), one should take care at least that meat does not amount to more than one-fifth of the meals, while four-fifths are vegetables, rice, noodles, barley, Indian meal, farina, legumen, and everything in the way of potatoes. A sudden and thorough change in the custom of eating and drinking may, however, have disadvantageous consequences, hence be cautious during the change. Drink good water.

The Skin.—Before all other things take good care of the skin. Rub the whole body daily with water by means of a rough linen towel, dry the body, rub it thoroughly with a dry towel until the body is dry; begin with the legs and arms and proceed then to neck, head, chest, abdomen and the back. The clothing should not be too thick but comfortable.

The Gargle.—To strengthen the pituitary membranes, gargle daily with cold water and rinse the nose, afterward take a few drinks of water.

While eating, chew well the meals; "well chewed is half digested," is of great importance in this case. Keep the house and the rooms very clean.

The Bandage.—The life should be very regular. Keep the abdomen warm. He who thinks that he needs a woolen bandage around the abdomen should wear it not below but above the linen or cotton shirt.

The Bowels.—Take care that the bowels move regularly every day. In cases of diarrhœa, as well as of consumption, take a clyster with a syringe containing about one-fourth pine (*i. e.,* one gill) of water at 59 to 66 degrees; also apply during the night a bandage around the abdomen (see the description in the above article on worms), the water used for this purpose having a temperature of 72 degrees. (While most people and even physicians think that a clyster—injection—is only good to make the bowels move, it is a fact that one may also cure diarrhœa with it.)

Who lives according to these rules may be sure that he does the very best to prevent cholera morbus and should not be afraid. To be afraid is disadvantageous.

Treatment of Cholera Morbus.—1. Cholera morbus never attacks a healthy person unexpectedly; there are always before symptoms of the developing disease. If the symptom is a light diarrhœa, sometimes with an unpleasant feeling in the abdomen, rub the whole body at once thoroughly with water of 66 to 73 degrees (one part of the body after the other, while the body is warm), place a bandage around the abdomen (see the description in the above article on Worms), and put a hot-water bag at the feet; keep the bandage on for about an hour; but if it should become hot quicker, replace it repeatedly. As soon as the feet get warm, wash them with cool water and repeat this four or five times during this hour. When the bandage has been taken from the abdomen, rub again the body with water and apply a small injection with the syringe, the water having a temperature of 68 degrees. These injections should be given especially after the bowels have moved. If this treatment does not help apply a steam-bath in a suitable form, following with cooling bath, shower-bath or rubbing of the whole body. After that massage of the body and exercises or a good walk.

2. When the symptom of the developing disease consists in constipation apply injections with the syringe, about half a pint or one-fourth pint, with water of 73 to 90 degrees; repeat the same every hour or every second hour if the bowels do not move; and if this is not successful give the patient a "sitz-bath" (see the description below) at 68 to 86 degrees for five to ten minutes, while the body is kept warm and a hot-water bag is placed at the feet. Don't apply this bath when the patient feels cold, nor when he has a disease of the heart or the lungs, nor when he is nervous. Avoid any irritating meals.

Description of the Sitz-Bath.—The sitz-bath may be taken in the bath-tub or any large vessel. The water may reach up to the navel. This sitz-bath is not only good in the case of cholera morbus, but may also be applied against indigestion, rush of blood to the head, diseases of the abdomen, hemorrhoids and female diseases. These baths are often very important and their success becomes often apparent after a short time only. According to the disease and to the condition of the patient, the temperature of the water may be 66 to 73 or 82 or even more; it should be taken for five to fifteen minutes and in special rare cases for twenty-five to thirty minutes. Kneading, rubbing and massage of the abdomen during the sitz-bath are often advantageous.

GONORRHEA.

Treatment.—Keep quiet and avoid irritating meals, eat dishes seasoned very mild only, avoid all alcoholic drinks, avoid meat, drink much fresh water and enjoy the fresh air; avoid all opportunities which would cause an excitation of the genitals.

Take daily a half-steam-bath or a half-bed-steam-bath (this is a bed-steam-bath as described in the article on chicken-pox, but reaching up to the navel only, three hot-water bags, wrapped up in damp cloths, being placed at the feet), put a special damp compress, moistened with water of 73 degrees, on the genitals. Take afterward a bath of 88 degrees.

Take daily two or three sitz-baths in water of 77 degrees for fifteen to twenty minutes. During the night place a bandage around the abdomen (see the description in the article on Worms). In case of constipation make injections with the syringe. Instead of the sitz-baths, three or four partial baths of the genitals in water of 82 to 86 degrees may be taken, each for ten to twenty minutes; perhaps also repeated washing of the genitals with water of 77 degrees. Drink much water in order to dilute the urine. If one wants to inject water of 82 degrees into the urethra, this must be done very softly by means of a small syringe with rounded (not sharp) mouth; such injections may be made several times daily, especially after having made water. In the meanwhile also soothing or exciting bandages (see the description in the article on Cancer) may be made on the genitals, with water of 73 to 77 degrees, the compress being all wrapped up in a woolen cloth. To prevent inflammation of the scrotum, or when it has become inflamed, protect it by a suspensory, which is to be buckled on in a careful and suitable manner.

AGUE.

Treatment.—For cases of ague or fever-shivering, rub the patient thoroughly (dry or wet) and then give him a dry-wrapping or a bed-steam-bath (see the descriptions in the articles on Itch and on Chicken-pox). When he perspires, let him take later a bath of 86 to 89 degrees. Should this treatment cause prickly-heat on the body, looking like measles or small-pox, and so forth, this should be regarded as a good sign, because in this way the morbid matter is removed from the body. To remove it thoroughly the patient should take some more bed-steam-baths, or exciting

bandages, as described in the article on Cancer, should be applied, in order to make him perspire moderately. A bath has to follow.

BOILS.

Treatment.—In all cases which have been caused by bad blood a "restorative cure" should be used (see the description below). Further put soothing or exciting bandages (as described in the article on Cancer) on the sick portions of the body, the wet linen being folded up in six to twelve layers and moistened with water of 72 to 100 degrees, according to the nature of the boil. This compress must be well covered with a woolen patch much larger than the boil; when the compress begins to get dry it is to be renewed. These compresses cool, dissolve the boil and suck out the morbid matter. It is further important to clean each boil thoroughly by washing and dipping out with lukewarm water.

The Restorative Cure.—This cure is not only good in the treatment of boils but should be applied generally in all chronical diseases, as the body needs to be first strengthened in general. This cure will always give good results whatever the special disease may be. A natural, not irritating diet is required: bread, vegetables, milk, anything made of milk and of eggs, oatmeal, fruits, now and then a soft-boiled egg is allowed. Meat should not be eaten in too large quantities; strong coffee, all alcoholic drinks, tobacco, spiced dishes, and so forth, are entirely forbidden. Drink mainly water, drink it often, especially before taking a walk, and before retiring at night a drink of water is to be recommended; lemonade, cocoa, malt-coffee are also allowed. The diet should be moderate; when the patient begins to feel better he should not stuff at once his stomach. The patient should enjoy the fresh air as much as possible and should take good care of the skin by daily washing or rubbing once or twice the whole body with water of 82 to 95 degrees; the applications described in the article on the Kneipp Cure are also to be recommended.

CONSUMPTION.

Treatment.—The principal object to aim at is the production of a healthier and purer blood; this requires a simple, digestible, nourishing and not irritating diet and plenty of pure and fresh air. The patient should sleep at open windows and exercise the lungs by uniform and slow breathing in and out in good fresh air. The patient should not work as a tailor, seamstress or in an office, in general not in such a pro-

fession or trade where he must sit continually. As long as the disease is still in the beginning period, light work in the garden, done cautiously, renders excellent service. In cases in which the disease has already made more progress the patient should begin with washing the upper part of the body with water of 86 degrees. When he has accustomed himself to these washings he should begin to wash also the lower part of the body; for this purpose he should use water of 73 to 77 degrees. Two points are to be kept in mind: first the patient must be comfortably warm while he is washed, and should afterward take care to dress himself quick and get warm by means of motions; second, while the patient is washed he should sit still, the washing and later the drying should be done by an attendant. Who has no attendant at his disposition should not do these washings at all. When the patient feels cool and uncomfortable, or when the weather is cool and rainy the washings should not be performed. As long as the patient is strong enough he should take walks in pure and sunny air as much as possible.

COLD.

Treatment.—Any disease which might arise from a cold is best prevented by a cure producing a strong perspiration so that the interrupted activity of the pores of the skin is restored. Take a bed-steam-bath (as described in the article on Chicken-pox); a rubbing of the whole body or a bath follows. See also the remarks in the articles on the Kneipp Cure and on Ague.

DIPHTHERIA.

Treatment.—The patient is to be separated from the healthy people. The windows of the room where he rests should be open. He should be covered with one or two woolen blankets which must be aired several times daily, if possible, in the sun. The floor of the room is to be cleaned daily. The following special treatment is very successful: A full bed-steam-bath (as described in the article on Chicken-pox), combined with a cool bandage around the neck, which is applied as follows: Put a towel into water of 54 to 56 degrees, wring it out moderately and place it around the neck of the patient so that it reaches up to the ears. The upper half of the bandage is now covered with a woolen cloth. The duration of the bed-steam-bath is 45 minutes to an hour. Should the patient become uneasy the wrapping is to be removed earlier. If necessary this packing is to be repeated twice or three times during twenty-four hours. Afterward the body is to be washed

with water of 73 to 86 degrees. Further, the mouth is to be cleaned repeatedly by gargling; one-fifth of a lemon per glass of water. Only when the patient wants to eat give him buttermilk, apple-marmalade, fruits, oatmeal, and so forth.

DYSPEPSIA.

Treatment.—The patient should take only small quantities of easily digestible food. After any meal his body and mind should rest. Anything that is eaten should be well chewed. The best food is rice, fruits, stale rolls, and now and then a drink of water; begin first with very small quantities of water, so that the stomach can warm it, and drink gradually more and more water. Rub daily the whole body with water or take a bath, also rub repeatedly the abdomen; the sitz-bath (described in the article on Cholera Morbus) is a very good remedy in all cases of indigestion and dyspepsia.

CROUP.

Treatment.—As soon as the suspicious cough makes its appearance the patient gets a full wrapping or three-quarter wrapping (as described in the article on Chicken-pox); the linen cloth in which he is wrapped must contain much moisture; the temperature of the water used is 82 degrees; a hot-water bag, which is covered with a wet cloth, is placed at the feet; the duration of the wrapping is one and one-half hours. After that a bath of 91 degrees, while at the same time the neck is poured over with water of 59 to 73 degrees. This treatment is repeated after five or six hours. Should the condition of the patient become worse the treatment is to be repeated at once. Besides this bandages around the abdomen every two hours with a water temperature of 82 degrees, the bandages around the calves with water of 73 degrees, also every half hour soothing bandages around the neck with water of 73 degrees (as described in the article on Cancer) are to be recommended. Enjoy the fresh air by opening the windows, drink fresh water, avoid irritating food, and in case of constipation use the syringe to make the bowels move.

FELON.

Treatment.—Take often a "hand steam-bath" by holding the hand for some time over a pot filled with boiling water, the hand and pot being wrapped up in such a way that the steam cannot escape. After that,

bathe the hand in lukewarm water. During the night exciting bandages around the hand (as described in the article on Cancer), with separate compresses on the sick fingers, are to be applied. Every other day, and later every third or fourth day, let the patient take a bed steam-bath (as described in the article on Chicken-pox), also with separate compresses on the sick fingers. The sick fingers should be thoroughly kept clean and care should be taken to protect them from cold.

SYPHILIS.

Treatment.—Before all other things the food for the patient should not be spicy, nor should he eat meat; further he should enjoy the fresh air as much as possible and should sleep at open windows. The patient should daily take a steam-bath of about fifteen to twenty minutes, after that he should be wrapped up, and should later take a bath of 88 degrees. Instead of that daily, a full steam-bath or a three-quarter steam-bath (as described in the article on Chicken-pox), with following bath of 86 to 88 degrees can be applied. Bad cases have been cured by this treatment, combined with a strict diet, as mentioned above. Further, let the patient take, if possible, daily, two or three sitz-baths at 73 degrees (as described in the article on Cholera Morbus), each bath for fifteen to twenty minutes. When the genitals are inflamed, separate compresses are to be applied. In case the scrotum is inflamed, a suspensory is necessary. Points which discharge matter must be covered with wet linen, and above that a woolen patch is placed. The moist compresses are to be renewed, when necessary, day and night. The sick portions of the body get a bath twice or three times a day and must be carefully washed and kept clean; cleanliness is of the utmost importance. To strengthen the body, the rules of the restorative cure should be applied, as described in the article on Boils.

GOUT.

Treatment.—Avoid any irritating food, the best is that the patient accustoms himself gradually to a vegetarian diet. He ought to drink plenty of fresh water; also the juice of lemons dissolved in water. He should enjoy the fresh air as much as possible and sleep at open windows. He should take care that the bowels move regularly every day; otherwise he should use the syringe. When a painful attack of gout occurs, soothing bandages which contain much moisture (as described in the article on

Cancer) are placed around the aggrieved bones; when the bandages have been removed, wash the skin lightly with bare hands, afterward massage, first in a soft manner and gradually in a more and more effective way, then again soothing bandages. When the pain is great, the bandages should be made rather moist, so that they may be left on the skin for a longer time in order not to trouble the patient too much. During the free pauses, the patient should be brought daily to perspiration by means of a bed steam-bath of one and one-half to two hours (as described in the article on Chicken-pox), afterward a bath in water of 88 degrees, or instead of the bath, the whole body is rubbed off with water of 73 degrees. During and after the bath massage of the painful portions of the body is to be recommended. Sun-baths have also been applied to good advantage against gout.

Description of a Sun-Bath.—This bath has a very good influence in many diseases; when the patient is nervous, it should, however, be applied only with much caution. One form of a sun-bath is as follows: On a warm summer day the patient is laid upon a mattress upon which the sun shines, but at a place where there is no breeze or air, he is covered with a light cloth only and his head is protected by a parasol. He will soon begin to perspire; he lies first on the back and then on the stomach. After he has perspired, he is sprinkled with lukewarm water on the hind part of the head, the shoulders, the breast, the back and the legs; or the whole body is rubbed off with water. For some patients it may be of advantage to use cold instead of lukewarm water.

JAUNDICE.

Treatment.—Avoid any irritating food; the best is that the patient should live for some time on a strictly vegetarian diet, vegetables, fruits, bread; no meat, fat or eggs. Much fresh air, the windows of the sleeping-room being kept open; daily two to four bandages around the abdomen, with water of 73 to 83 degrees (as described in the article on Worms), each bandage for about two or three hours. Further, the whole body should be rubbed off once or twice daily with water of 73 degrees, or instead of that a bath in water of 91 degrees. One may also apply for some time bed steam-baths (about three per week) with following bath of 91 degrees or rubbing off of the body with water of 73 degrees. In more serious cases the rules of the restorative cure (see the article on Boils) should be considered. In case that gall-stones are present the patient must drink

plenty of water. Further, when there are symptoms of inflammations, compresses should be placed near the liver, the temperature of the water being 78 to 82 degrees. These compresses are to be replaced or removed according to the wishes of the patient.

MUMPS.

Treatment.—When the swelling of the glands is due to bad blood the principle of the cure must be to help nature in bettering the blood. Just the glands are used by nature for purifying the blood and removing morbid matter. Therefore, the activity of the glands should be supported by steam-baths, baths in the tub, wrapping, washing, and so forth; further the circulation of the blood should be regulated by suitable massage; finally the quality of the blood should be bettered by good and healthy, but not irritating food, and by fresh air at day and night.

For acute mumps the following rules of cure may be given: Daily a bed steam-bath (as described in the article on Chicken-pox), with separate compresses around the neck, for one hour or for an hour and a half, and besides extra compresses around the neck with water of 68 to 73 degrees, well covered with woolen cloth. When they become hot so that the patient feels uncomfortable (about every thirty or forty-five minutes), they are to be replaced. Afterward the whole body is rubbed off with water of 73 degrees. A vegetarian diet is to be recommended.

RHEUMATISM.

Treatment of Acute Rheumatism.—Daily a bed steam-bath (as described in the article on Chicken-pox) for one hour or an hour and a half. Before this bed steam-bath massage first of the sound, then of the sick portions of the body with warm hands, moistened with fresh water. After the bed steam-bath the whole body is rubbed off with water of 66 degrees, with massage of the sick portions. The latter also receive often soothing bandages (as described in the article on Cancer); when they are removed cold rubbing and massage of the sick portions with bare hands. Take care that the bowels move regularly. Apply during the night a bandage around the abdomen (as described in the article on Worms). In case the inflammation and the pain are very great it is better not to use massage in the first time.

Avoid irritating food, strictly vegetarian diet is to be most recom-

mended. Avoid all exciting drinks, such as coffee and alcoholic drinks. Breathe fresh air in the house and outside; sleep at open windows. Drink often water and lemonade in large quantities.

SCARLET FEVER.

Treatment.—Separate the patient from the healthy people. Take care that the formation of the scurf on the skin goes on regularly so that the body is supported by the treatment in removing the morbid matter. Bandages around the middle part of the body and around the legs with water of 73 degrees (as described in the article on Cancer). When the patient has a high fever, wrap up the body (as described in the article on Chicken-pox) and put a moist towel around the neck (as in the case of diphtheria); also a bath of 86 to 91 degrees. To support the body in removing the morbid matter, apply bed steam-baths with following luke-warm baths (as described in the article on Chicken-pox). Avoid irritating food, eat much fruit, drink much fresh water, take great care not to catch cold, especially during the time the scabs fall off; but fresh air is to be brought continually to the room by opening the window. In case of constipation, apply the syringe to make the bowels move. Be careful for some time after the patient has recovered in order to prevent a relapse.

SMALL-POX.

Treatment.—Separate the patient from the healthy people. Take care to have fresh air in the room where the patient lies. Greatest cleanliness, frequent change of the underwear, daily washing of the whole body. Avoid any irritating food. Drink often fresh water, also lemonades of fruit juices. Further three-quarter or full packing (as described in the article on Chicken-pox), the water used for this purpose has a temperature of 68 to 86 degrees. Further an extra compress around the middle part of the body. This packing is made up as follows: On a mattress is placed a large woolen cloth, above that a large linen cloth which had been put into water of 68 to 86 degrees, and had been well wrung out. These two cloths are for the three-quarter or full packing. On the large linen cloth, where the middle part of the body will lie, place a large towel which has been moistened in the same water and is used as extra compress.

Put above this the patient. Wrap the towel around the middle part of his body, then the large moist linen cloth around his body, and wrap him finally up in the large woolen cloth. The duration of this packing is

one hour or an hour and a half or even more, in general as long as it is comfortable to the patient. Afterward a mild washing of the whole body or a bath of 86 to 91 degrees with a following shower-bath. After this the patient is dried and brought to bed, or he is not dried, but, wet as he is, he is covered by a dry linen cloth, brought to bed and well covered with the blankets. As soon as the fever has again increased, this treatment is to be repeated. To prevent as much as possible the formation of scabs in the face, put continually compresses of 66 to 73 degrees on head and face.

WHOOPING-COUGH.

Treatment.—Separate the patient from the healthy people, as the whooping-cough is contagious. Daily one to two lukewarm (82 to 93 degrees) three-quarter bed steam-baths (as described in the article on Chicken-pox), with an exciting bandage around the shoulders (as described in the article on Cancer), of a duration of one and a quarter to one and a half hours; afterward a bath of 88 to 91 degrees is given or the whole body is rubbed off with water of 73 degrees. During the night a bandage around the abdomen (as described in the article on Worms) is applied; the water used for this purpose has a temperature of 82 degrees; the bandage must be very well covered with a woolen cloth. It is also to be recommended to take a small drink of moderately cold water after every attack of cough. Fresh air day and night; the windows of the sleeping-room should be open. Vegetarian diet, in which all irritating food is avoided. Let the patient eat fruits and slimy food, such as water gruel, barley-water, and so forth; further, let him drink lemonades of fruit juices. Meat should be avoided. Change of air, or the removal of the sick child from the town where there is an epidemic of whooping-cough, is also to be recommended.

MEDICAL SCHOOLS

PART IX.

ELECTRICITY IN MEDICINE.

Application.—At first electricity was thought to be useful for only that class of diseases due to the nerves and it was generally applied by means of the galvanic battery, which was made in various forms for home use. But the treatment has grown to embrace a variety of diseases.

Dyspepsia.—Electricity is found to be an excellent treatment for dyspepsia on account of the relief it affords to both the physical and mental conditions that accompany the disease. It gives tone to the appetite, cures sleeplessness, removes distress after eating, strengthening the powers of digestion and drives away despondency and gloom.

Fits, Epilepsy, Falling Sickness.—These diseases being nervous in character yield satisfactorily to the electric treatment. Any nervous disease is more readily reached by electricity than by other remedies and some remarkable cures have been placed to its credit.

Anemia.—This means want of blood and the patient becomes pale and weak. The disease is a general condition, and as a cure electricity is found efficacious. It stimulates the same as oxygen, produces more red corpuscles in the blood, imparts increased vital energy to the blood currents and does away with languidness and depression.

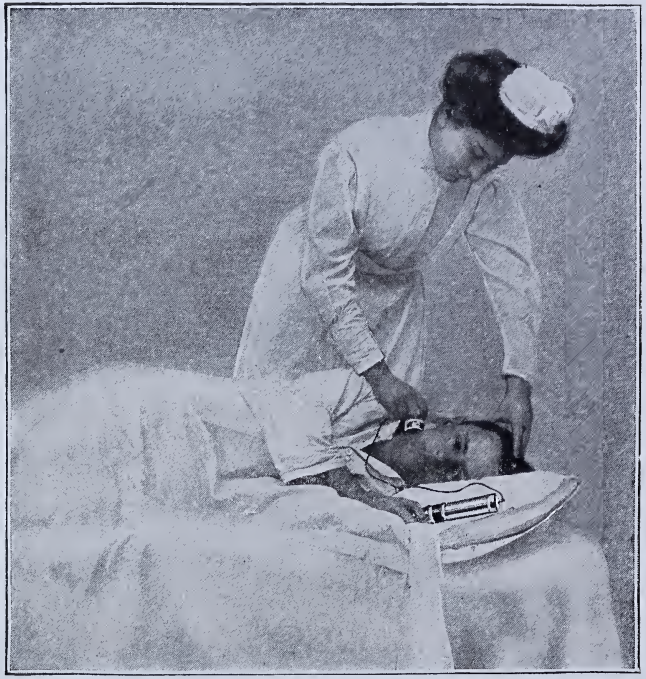
Consumption.—When this disease is traceable to catarrhal inflammations, faulty secretions and impaired nutrition, electricity is found beneficial as a purifier of the blood, a quickener of circulation and a preventive of the tuberculous deposits in the lungs. It is even claimed that by its stimulating effects on nutritive functions it builds up that part of the system which has gone to decay.

Catarrh.—Those skilled in electric-healing claim that electricity is almost a specific for the cure of this disease and they have placed many cures to its credit. The grip and hay-fever, being catarrhal in their nature, are also treated effectively by electricity.

Nervous Debility.—This is produced by a constant drain upon the nervous forces and fluids of the system. Its symptoms are loss of memory, dimness of sight, constipation, gloominess, impoverished blood, and

X-Ray plate showing fracture of the forearm.

Treatment of Abdomen with the Electric Battery



Application of Electric Massage to the Face

so forth. The modern electro-therapeutic treatment is applied with great success in this distressing disease and many permanent cures are claimed.

Neuralgia.—This painful nervous disease yields to but few treatments, but it is claimed that the electric treatment can be relied on in all cases, acute or chronic, to give almost instant relief and effect a cure.

Sciatica.—This is only another form of neuralgia and is also amenable to treatment by electricity.

Rheumatism.—In modern electro-therapeutics it is found that rheumatism yields readily to the electric treatment, the claim being that the disease is due to a storing of waste material in the body which can only be removed through the circulation, a process which electricity effects when skilfully applied.

Diabetes.—In this terrible and baffling disease the electrical treatment has been found efficacious, not only arresting the disease but producing cures. The claim is that it stimulates the system and so fortifies nature that the disease is finally overcome.

Kidney Diseases.—In diseases of the urinary tract producing weakness of the organs, extreme nervousness, milky or cloudy urine, pain in the back, frequent, scanty or painful urination, the electric treatment is found to have a powerful tonic effect on the organs, enabling them to reassert their functions and in the end eradicate disease.

Paralysis or Palsy.—This disease, due to an overworked or debilitated nervous system, is amenable to the electric treatment, and it has been found that such treatment is about the most effective that can be used.

Conclusions.—It will be seen that while many of the diseases curable by electricity are outside of the strictly nervous class, yet all are more or less associated with that class, so that after all, the merits of the electric treatment may be said to rest largely on its stimulus to and power over the nervous system.

THE X-RAY

An astounding electrical revelation came during the last years of the nineteenth century through the discovery of the X, or unknown, or Roentgen, rays. In 1894 Hertz showed that the cathode rays of the Geissler tubes would penetrate thin sheets of metal placed within the tubes. Subsequently Paul Lenard showed that the cathodic ray could be investigated as well outside of the tube as within it, and secured some photographic effects. Professor Roentgen took up the subject, and, in 1896, fairly set the scientific world aflame with the announcement that the cathodic, or X, ray would not only penetrate solid substances, but

deposit solid substances within or behind those other substances. He invented a photographic instrument to take advantage of his discovery, and by means of it, electricity was turned to the account of photography, pictures being possible of the interior of the human body, and of any foreign substance therein.

The discovery and application of the X-ray has proved of immense value to medicine and surgery. By its means the physician is enabled to carry on far-reaching diagnoses, and to ascertain with certainty the whole internal structure of the human body. Fractures, dislocations, deformities and diseases of the bones may be located, and their character and treatment decided upon. In dentistry the teeth may be photographed by means of the X-ray, even before they come to the surface, and broken fangs and hidden fillings may be located. Foreign objects in the body, as bullets, needles, calculi in the bladder, etc., may be located, and the surgery for their safe removal greatly simplified. The beating of the heart, movement of the ribs in respiration, and outline of the liver and other organs may be exhibited to the eye. It has even been suggested that the X-ray may become an agency for destroying the bacilli which produces disease in the human body. Verily the X-ray opens the field for the grandest of electrical possibilities.

MEDICAL SCHOOLS

PART X.

MENTAL HEALING

No medical work is complete that deals only with drugs. Many theories of healing deal with the mind alone. The mind, which tells us of all our sufferings, is the path along which relief and recovery often travel.

Mesmerism.—This is a peculiar nervous condition in which the body and mind of an individual are supposed to be influenced by a mysterious force emanating from another person.

Hypnotism.—This is a condition artificially produced in which the person is apparently asleep and yet acts in obedience to the will of the operator as regards both motion and sensation.

Mind Cure.—This is the cure of disease by means of the mind alone.

Christian Science.—This teaches that those who really follow Jesus should follow Him in healing, which can be done through the mind.

Telepathy.—This is a power of mental vision or of mental hearing, or of a mental production of other sensations, by which the individual becomes aware of events happening in another part of the world from where he is, or can tell of the existence of objects which could not affect at any time any of his bodily senses.

HISTORY OF MENTAL HEALING.

It is natural that the apparent power of influencing the bodies and minds of others should attract much attention and be eagerly sought after for purposes of gain, or from love of the wonderful and supernatural, or for the cure of diseases. So, while many have studied mental healing in a scientific spirit, more have done so as quacks and charlatans for the mere purpose of making money.

Modern Study of Mental Healing.—Recently, however, physicians and other scientists have set about investigating the subject and giving it

much study and attention. The result has been that animal magnetism, as this power is sometimes called, has been put on a level with other sciences and has helped in relieving the sufferings of humanity.

Ancient Mental Healing.—In all ages there have been certain persons who could cure disease by a touch of the hand and who could communicate a healing virtue to the sufferer. Among the Chaldeans, the Babylonians, the Persians, the Hindus, the Egyptians, the Greeks and the Romans many of the priests effected cures or threw people into deep sleeps in the shades of the temples. During these sleeps the sleeper sometimes had prophetic dreams. Ofttimes they could produce effects like those now referred to animal magnetism.

Supernatural Influence.—Such influences were held to be supernatural, and they added greatly to the power of the priests. In the middle of the seventeenth century there appeared in England several persons who said they had the power of curing diseases by a stroke of the hand.

King's Evil Cure.—Valentine Greatrakes, in the County of Waterford, Ireland, attracted great attention by his power of curing the king's evil or scrofula. Thousands of sufferers crowded to him from all parts of the kingdom. About the middle of the eighteenth century John Joseph Gassner, a Roman Catholic priest in Swabia, claimed that the majority of diseases arose from demoniacal possession, and could only be cured by exorcism. He believed his power to be altogether supernatural and connected with religion.

MESMERISM.

The Name.—Mesmerism was named in honor of one of its early investigators. Friedrich Anton Mesmer was born at Weil, on the Rhine, on May 23, 1733. He studied medicine at Vienna, took his degree and commenced to practice.

Mesmer's Belief.—He was always very much interested in astrology, and he believed that the stars exerted an influence on beings living on the earth. At first he thought this supposed force was the same as electricity. Afterward he believed it to be identical with magnetism. From this he deduced the theory that stroking diseased bodies with magnets might bring about a cure. He published his first book in 1766. Ten years later, while in Switzerland, with Gassner, he observed that the priest effected cures by manipulation alone, without the use of magnets.

Cure by Touch.—This led Mesmer to discard the magnets and to try

to cure without them. He found he could relieve suffering by the mere touch of his fingers. He therefore supposed that some kind of occult force resided in himself by which he could influence others. He held that this force permeated the universe and more especially effected the nervous systems of men.

Marvelous Cures.—In 1778 he moved to Paris, and in a short time the whole city was thrown into a state of great excitement by the marvelous effects of mesmerism. Mesmer made many converts.

Paris Inflamed.—Many controversies arose, however. The whole medical faculty of Paris rose in indignation and stigmatized him as a charlatan. But still the people crowded to him. He was offered 20,000 francs by the French Government for the disclosure of his secret, but he deliberately refused the offer. He received private rewards of large sums of money.

Mesmer's Office.—Everything about his office was enveloped in mystery. His consulting apartments were dimly lighted and hung with mirrors. All was quiet and still, save for the soft strains of music that occasionally were heard. All sorts of odors were wafted through the room.

Mesmeric Methods.—The patients sat around a kind of vat, in which various chemical ingredients were concocted or simmered over a fire. Holding each other's hands, or joined by cords, the patients sat in expectancy. Then Mesmer, clothed in the dress of a magician, glided amongst them, affecting one by a touch, another by a look, while he made passes with his hand at a third. The effects of this differed greatly, but all were benefited. Nervous ladies became hysterical or fainted. Some men were seized with convulsions and palpitation of the heart.

Franklin's Investigation.—The French Government appointed a commission of physicians and members of the Academy of Sciences to investigate these phenomena. Benjamin Franklin, the great American philosopher, diplomat and scientist, was a member of this commission. Franklin and his fellow commissioners drew up an elaborate report. They admitted many of the facts, but they contested Mesmer's theory that there was an agent called animal magnetism. They believed the effects were due to physiological causes.

Mesmer's Fate.—While Mesmer himself was honest in his belief, he had many imitators who brought the science into disrepute. They were a lot of impostors who fooled the people for the sake of gain. Even Mesmer himself was denounced as an impostor and a fraud. He finally had

to leave Paris, and died at Meersburg in Switzerland, on the 5th of March, 1815.

The New School of Mesmerism.—Mesmer left many disciples who investigated the subject in a scientific spirit. Chief among these was the Marquis de Puysegur. This nobleman revolutionized the art of mesmerism. He showed that many of the phenomena might be produced by gentle manipulation, causing sleep, and without the mysterious surroundings that Mesmer, himself, employed.

Spread of Mesmerism.—Since that time mesmerism has been studied by many. Each year more and more is known of it and greater use made of this knowledge. The power of mesmerism is no longer confined to France and Switzerland, nor is it exercised only by Mesmer's followers. There is scarcely a town in this country that does not contain at least one inhabitant who can heal by the stroke of the hand. Few, indeed, are those who have not seen or heard of one possessing this peculiar power.

The Mesmeric Power.—All who exercise this influence do not have power in the same degree. Some, of course, are noted for their magnetism and travel from city to city curing hundreds by their touch. Many, however, are not known outside their native village, where their gentle stroking is eagerly sought for by those suffering from terrific headaches, which nothing else can relieve. Not a few possess this power in a small measure without recognizing it as mesmerism. Many a throbbing, fevered brow has been soothed by a gentle mother's hand. How often has the touch of magnetic fingers done more than all the medicines the doctor has ordered.

Mesmerism in the Household.—Those who find that they possess this soothing property of animal magnetism, in ever so slight a degree, should endeavor to cultivate and increase that power by proper exercise. When one discovers that a light touch of the hand will cause an electric thrill which seems to drive away pain and suffering, that person must try again and again and find what strokings will bring about the best results.

Electricity in the System.—Some are born with more electricity in their system than is possessed by the average mortal. This can be seen by combing one's hair in the dark, when bright sparks will fly. Often rubbing the ends of the fingers together will bring a spark large enough to light a gas burner. If this electricity or magnetism is developed in the proper channels it will make its possessor one of the most sought after of mortals.

Mesmerism in Disease.—There are many diseases that medicines cannot cure. Some to whom medicines give no relief can be cured by the current from the electric battery. But many sufferers are turned away with the terrible verdict that nothing can be done for them. In not a few of these cases animal magnetism or mesmerism has effected a cure.

Mesmeric Cure of Headache.—In those cases of sick headache where drugs have only increased the agony, a few light touches of a magnetic hand have caused the pain to disappear, and sweet, refreshing sleep to take its place.

HYPNOTISM.

Name and Principle.—In the year 1841, a surgeon in Manchester, England, James Braid, began the study of what he called the pretensions of animal magnetism or mesmerism. He started without believing in it at all, calling himself "a complete skeptic" regarding all its phenomena. While investigating this subject he discovered that by a fixed and abstracted attention of the mind and sight on one object he could artificially produce a peculiar condition of the nervous system. To this condition he gave the name of neuro-hypnotism or nerve sleep; from the Greek *ζευρου,* nerve and *υπηοζ,* sleep. Later the part neuro was dropped and the term hypnotism came into general use.

Hypnotism Explained.—At a meeting of the British Association in Manchester, on June 29, 1842, he read an essay on the cure of disease by hypnotism. In the following year his book came out, in which he reported a great number of cases in which he had successfully applied hypnotism in the relief and cure of disease.

Hypnotism a Science.—Since Braid started his investigation scientists in every country have studied the subject until now hypnotism is considered one of the national sciences.

Generally Taught.—In every college of the land hypnotism is taught and in every large city that art is practiced. It is not astonishing that this subject has caused such study among the scientists and has excited such wonder among all who have witnessed its workings.

Phenomena.—To think that by holding up a bright object or by waving a hand one person can put another so completely in his power that the victim not only acts but even thinks as the operator desires. If the operator tells his patient to walk across the room the patient shrieks in terror at what he believes is a wild beast.

HOW HYPNOTISM IS PRODUCED.

Manner of Hypnotizing.—The usual method of inducing the hypnotic state is to cause the person operated on to stare fixedly at a bright object, such as a glittering piece of glass, or a polished watch charm, or the shining steel of a penknife. This object is held at from eight to fifteen inches from the eyes in such a position above the forehead as will strain the eyes and eyelids.

Effect on Eyes.—The operator may stand in front of, to one side of or behind the patient. As the patient strains to see an object so near it will be noticed that the pupils, the little round dots in the middle of everyone's eyes, are at first very small. You can see this whenever a person tries to look at a near object.

Enlargement of Pupils.—In a short time, however, the pupils will begin to grow larger. It is then that the operator makes a few passes over the face without touching it. The eyelids then close. Or the operator may gently close them with the tips of the fingers, at the same time very gently stroking the cheeks. Often a twitching of the eyelids may be observed when they are closed. The eyes may afterward become widely opened.

The Hypnotic State.—The patient is now in a sleep-like condition. The limbs often remain in almost any position in which the operator may place them. At the same time the patient may now be caused to make movements in obedience to the commands of the operator. He must also act according to the ideas suggested to him.

Hypnotic Illusions.—Thus, he may eat a raw potato with relish, apparently under the impression that it is an apple. He may make wry faces on drinking a glass of water when told that what he is taking is castor oil. He may ride on a chair or stool as in a horse race. He may fight with imaginary enemies or show tolerance of affection to imaginary friends. In short, all kinds of actions, even of a ridiculous and degrading character, may be done by the patient at the command of the operator.

Effects on Muscles.—Another class of phenomena consists in the production of stiffness or rigidity of certain muscles or groups of muscles, or even of the whole body. For example, on stroking the forearm it may be rigid while bent or stretched out. The knee may be strongly bent with the muscles stiff, hard and immovable. The muscles of the trunk may become as rigid as to allow the body to rest like a log with the head and heels on two chairs. In this position it is so stiff and rigid that it can bear the

weight of the operator sitting upon it. The patient may be made to hear sounds that don't exist and to see colors and feel various sensations which exist only in the patient's mind.

Waking Up.—The patient may remain in this condition for an hour or more. He may then be roused by holding him for a few minutes and blowing gently into the eyes; sprinkling water, making upward passes or simply saying "wake up" are other methods employed for awakening.

After the State.—Usually the patient has a vague recollection, like that of a disturbed dream. Sometimes, however, the patient distinctly remembers all that has happened and even feels ashamed at having been compelled to do ridiculous actions.

Who May Be Hypnotized.—Certain persons are more readily hypnotized than others. It has also been observed that, once the condition has been successfully brought about, it can be more easily induced a second time, a third time more easily than a second, and so on. Finally the patient may be so under the will of the operator that a fixed look, or a wave of the hand, may throw him at once into the condition. M. Liégeois has hypnotized some of his subjects by telephone. Children under three or four, on the other hand, and insane persons, especially idiots, are unusually hard to hypnotize.

THE SYMPTOMS OF THE TRANCE.

Loss of Memory.—In the earlier stages of hypnotism the patient remembers what has happened, but with successive sittings he sinks into a deeper condition, which is commonly followed by complete loss of memory. On waking he can recall nothing at all.

Return of Memory.—But just as we may be reminded of a dream by meeting persons or objects that figured therein, so on being prompted the hypnotic subject will often remember what happened in his trance. One can often make them remember by merely telling them during the trance that they shall remember.

Suggestibility.—The patient believes everything his hypnotizer tells him and does everything the latter commands. The patient may do things over which the will has normally no control. He will redden, turn pale, sneeze, become hot or cold, and so forth.

Effects on Motion.—Tell the patient that he cannot open his eyes or mouth, cannot unclasp his hands or lower his raised arm, and he will be immediately powerless to do so. Say his arm is paralyzed and it will fall limp at his side.

Hallucinations and Delusions.—You can make your subject think he is freezing or burning, itching or covered with dirt, or wet. He can be made to drink a cup of vinegar for a glass of champagne and may become drunk in consequence. A chair will be a lion, a broomstick a beautiful woman. The subject can be made to believe that his personality is changed into that of a baby, of a street boy or of Napoleon. He may even be transformed into a beast or an inanimate thing like a chair or a carpet.

Sensation Abolished.—Legs and breasts may be amputated, children born, teeth extracted and the most dangerous operations undergone without the patient feeling any pain. In the same way neuralgias, toothaches and headaches may be cured. In one case the sensation of hunger was abolished and the patient took no nourishment for fourteen days. A subject may be made blind to a certain person, and to everything pertaining to him. What he says is not heard and his contact is not felt.

Acuteness of the Senses.—The sense of touch is so delicate that a subject after simply poising on her finger tips a blank card drawn from a pack of similar ones can pick it out from the pack by its weight. A coin from the operator's pocket has been repeatedly picked out by the subject from a heap of twenty others by its greater weight. A subject may be made to hear a watch tick or his operator speak in a distant room.

Changes in the Tissues.—In certain subjects a congestion, a burn, a blister, a pimple or a bleeding from the nose or skin may be caused by a mere suggestion.

After-Hypnotic Suggestions.—These are given to the patient during the trance to take effect after waking. They succeed with a certain number of patients, even though the act is to be performed months or even a year after the command is given. In this way one can make the patient feel a pain or be paralyzed, or be hungry or thirsty, or do something ridiculous after coming out of his trance. In these cases he forgets that the suggestion was given him in a previous trance. He thinks he is acting of his own free will.

MIND-CURE.

The Mind and Disease.—It is well known that the mind has a great influence on matter. Physical changes have been wrought by mental states. Diseases have been caused and have been cured by the influence of the mind. Many instances can be quoted illustrating this fact. Persons have been shot dead with blank cartridges. An Edinburgh criminal died from

a supposed loss of blood when it was only warm water that was made to trickle over his arm after it was badly pricked by the surgeons.

A Case in Point.—Dr. Moore mentions the case of a lady who died with every symptom of hydrophobia under the mistaken notion that she had been bitten by a rabid dog when it was demonstrable that the animal had only torn her dress.

Another Illustration.—One of the most instructive and satisfactory experiments on record showing the influence of the mind in the generation of fatal diseases is that tried upon four Russian criminals who had been condemned to death for political offenses. The cholera was raging at the time in Russia, and the criminals, while ignorant of the fact, were made to occupy beds on which patients had recently died with the disease. Although thus exposed to the contagion not one of them exhibited the least symptom of the malady.

The Second Experiment.—After this they were told that they must sleep on beds that had been occupied by persons who had been sick with the cholera. But in fact the beds were entirely new and had never been used by anyone. Their fear proved to be a more powerful influence than the contagion, for three out of the four took the disease in its most fatal form and died in four hours after the attack.

Effect of Faith.—The influence of faith in the cure of disease is well illustrated by a fact mentioned in Paris's Life of Sir Humphrey Davy. In the early period of his scientific career, Davy was assisting Dr. Beddoes in his experiments on the inhalation of nitrous oxide. Dr. Beddoes, thinking the oxide must be a specific for paralysis, a patient was selected for trial and placed under the care of Sir Humphrey. Before administering the gas, wishing to ascertain the temperature of the palsied man's blood, a small thermometer was inserted under his tongue. The paralytic, wholly ignorant of the process to which he was to be subjected, but deeply impressed by Dr. Beddoes with the certainty of its success, no sooner felt the thermometer between his teeth than he concluded that the talismanic influence was at work, and in a burst of enthusiasm declared he felt its healing power through his whole body.

Carrying on the Experiment.—Here was an opportunity to test the influence of the mind in the cure of palsy that was not to be lost. The gas was not used, but on the following day the thermometer was again employed with equally marked effects, and at the end of two weeks the patient was discharged cured, no remedy of any kind having ever been

used except the thermometer. His faith made him whole, not by accident, nor by a miracle, but by an invariable law of our being.

The Power of Faith.—Faith is a spiritual force that has accomplished wonders. It is an actual psychological or spiritual force. To believe that we can do a thing, especially if that faith is the result of an understanding of nature's laws, empowers us to do it. To believe that we are well, or that we are becoming so, excites a spiritual force within us, that goes far toward making us so.

Faith in Remedies.—If we firmly believe that a certain remedy will cure us of a diseased condition, though it has no chemical adaptation to the removal of the disorder, we shall be benefited by it. Disease has often been cured by faith alone in the patients.

The Bible Instance.—The familiar case of the woman mentioned in the Gospel history, who had suffered for twelve years from a dangerous uterine hemorrhage, baffling the skill of various physicians, is known to all.

Requisites in Mind-Cure.—There are two things in a patient necessary to the mind-cure. One is a desire to get well. The other is a faith in the efficiency of the remedial agency.

How Mind-Cure Acts.—Through the grand system of sympathetic nerves each organ in the body is connected with every other, and the whole with the mind. There is no part or function which cannot be affected just as certainly, though perhaps not so sensibly, by the will-force, as the muscles of the arm.

The Nerve Conductor.—The pneumo-gastric nerve, according to Evans, which is distributed to all the organs within the cavity of the trunk, is the appointed conductor through which the mental force is communicated to them and influences their action. We have only to concentrate the mind's force upon any of the internal organs, as the stomach, liver or intestinal canal, and through the pneumo-gastric nerve its workings will be influenced.

Mind-Cure in Indigestion.—If the stomach has become exhausted of its nerve force so that it fails to do its work and the food in it is a motionless and fermenting mass, according to Evans, it can be made to obey the command of the sovereign mind. Concentrating the mind upon it, bringing our spiritual force to a focus, we may calmly and powerfully will it to proceed to business and attend to its proper work, and it will obey us as readily and as promptly as a good servant yields to the order of his employer. The same effect may be produced upon the action of the intestinal canal.

Mind-Cure for Cold Extremities.—Mental-curists claim that if the

blood and vital heat do not circulate through the extremities, which feel a deadly coldness, it is because the spiritual life does not permeate the tissues. We may send the spiritual principle there, by the will force, to distribute to the negative parts their share of the vital flame.

Every Man His Own Physician.—A little practice, according to Evan, will render the mind-cure easy and natural, and we can become our own physician and healer without the use of actual medicine.

TELEPATHY.

Mind-Sight.—We know that the somnambulist or sleep walker, in the darkness of the night, with his eyes closed, can climb dizzy heights and walk along dangerous precipices with ease and apparent safety. This power thus exhibited, according to Prof. Barnes, is evidence that there is a medium adapted to the sight of the mind which enables it to see things beyond the sense of ordinary sight. Many instances have occurred where persons in a natural state have discovered that they possess the power to divine the thoughts of others.

Division of Telepathy.—Telepathy or clairvoyance may be considered under two heads, namely, sympathetic and independent.

Sympathetic Telepathy.—A sympathetic clairvoyant takes on the feelings of the one with whom he is in sympathy. He very often feels, sees, hears, tastes and smells that which the other party does.

Telepathy in Disease.—He is sometimes able to locate pain and disease immediately through this wonderful faculty. Barnes gives the following examples of sympathetic telepathy: "I blindfolded a gentleman, placed my hands in contact with his, while the third party pricked me at various points with a sharp instrument. The subject would feel the pain immediately at the point upon his own body corresponding to the exact location where the instrument was being used upon me. . .

"I know a dentist in Western New York who is so sympathetic that he suffers whenever his wife does. He has the same feelings and never improves until she begins to recover. A pupil of mine, a contractor, who is exceptionally strong, told me that the above condition existed between himself and wife, and that the distance made no difference, as he was hundreds and sometimes thousands of miles away from home."

Independent Telepathy.—Independent clairvoyants are able to get information independently of any sympathetic relation, apparently. They are able to separate the soul from the body, as it were, and to travel to

foreign countries. Time and distance seem to cut no figure with them. Prof. Barnes recites many startling instances of this kind of telepathy.

Practical Application of Telepathy.—The usefulness of telepathy lies in the knowledge of its practical application. Understood and applied, it is a most valuable and valued instrument in the hands of the learned physician or in any of the walks of life.

CHRISTIAN SCIENCE.

Mortal and Divine Mind.—In Christian Science a great distinction is drawn between mortal mind and the Divine mind. Mortal mind is part of our material being, it belongs to matter, and it gives us our feelings of pain, sickness, error and sin. The Divine mind is spiritual. It is part of that Divine Spirit that fills the universe. It is God. Inasmuch as the Divine mind is God and fills the universe, it is good and truth. There can be no sin or sickness in divinity.

Nature of Sickness.—Sickness is merely a false impression conveyed by erring mortal mind. The way to cure both sin and sickness is by substituting the Divine mind for mortal mind. This can be accomplished by a proper realization of the Scriptures in their true meaning, according to Christian Science, until the seeker after truth separates the material from the spiritual, and thereafter is ruled by the Divine mind.

Principles of Christian Science.—The fundamental propositions of Christian Science as laid down by Mrs. Eddy in book "Science and Health," are summarized in the four following, to me, self-evident propositions. Even if read backward, these propositions will be found to agree in statement and proof:

1. God is all.
2. God is good. Good is mind.
3. God, Spirit, being all, nothing is matter.
4. Life, God, omnipotent good, deny death, evil, sin, disease.

Disease, sin, evil, death, deny good, omnipotent God, life.

The evidence of the physical senses often reverses the real science of being and so creates a reign of discord, assigning seeming power to sin, sickness and death; but the great facts of life, rightly understood, defeat this trend of errors, contradict their false witnesses and reveal the Kingdom of Heaven, the actual reign of harmony on earth. The material senses' reversal of the science of soul was practically exposed by the demonstrations of Jesus nineteen hundred years ago, yet this so-called

sense still makes mortal mind tributary to mortal body, and ordains certain sections of matter, such as brain and nerves, as the seats of pain and pleasure, whence matter reports to this mind its status of happiness or misery.

Revelation of Christian Science.—The revelation of Christian Science consists of two parts:

1. The rediscovery of the Divine science of mind-healing, through a spiritual sense of the Scriptures and through the teachings of the Comforter, as promised by the Master.

2. The proof, by present demonstration, that the so-called miracles of Jesus did not specially belong to a dispensation now ended, but that they illustrate an ever-operative Divine principle.

Prayer and Healing.—"The prayer of faith shall save the sick," says the Scripture. What is this healing prayer? A mere request that God will heal the sick has no power to gain more of the Divine presence than is always at hand. The only beneficial effect of such prayer for the sick is on the human mind, making it all more powerful on the body through a blind faith in God.

Right Prayer.—In order to pray aright we must enter into the closet and shut the door. We must close the lips and silence the material senses. In the quiet sanctuary of earnest longings we must deny sin and plead God's allness. We must resolve to take up the cross and go forth with honest hearts to work and watch for wisdom, truth and love. We must "pray without ceasing." Such prayer is answered, inasmuch as we put our desires into practice. The Master's injunction is that we pray in secret and let our lives attest our sincerity.

Method of Treatment.—Mrs. Eddy advises the following mode of treatment:

"Always begin your treatment by allaying the fear of patients. Silently reassure the patient as to his exemption from disease and danger. Watch the result of this simple rule of Christian Science and you will find that it alleviates the symptoms of every disease. If you succeed in wholly removing the fear your patient is healed."

Winning the Battle.—The great fact that God wisely governs all, never punishing aught but sin, is your standpoint, whence to advance and destroy the human fear of sickness. Plead the cause for science and in truth, mentally and silently. You may vary the argument to meet the peculiar or general symptoms of the case you treat; but be thoroughly persuaded in your own mind and you will finally be the winner.

MEDICAL SCHOOLS

PART XI.

HUMAN SCIENCE

PHRENOLOGY, PHYSIOGNOMY AND PALMISTRY.

"If any science, art or work has for its beginning, its object and its end the improvement of humanity and the advancement of the race, then that work, art or science deserves the encouragement and recognition that is its due."—*Cheira.* There is more in this science than may at first sight appear.

Phrenology.—We know that certain bumps upon the head indicate certain characteristics of human nature.

Physiognomy.—The color of the hair and eyes, the form of the mouth, of the chin and nose, the shape of the ears, afford certain and infallible indications of temperament.

Palmistry.—The shape of the hand and fingers relates to the hereditary influence of character and disposition; the lines and markings of the palm to the event of past, present and future.

OBJECT OF HUMAN SCIENCE.

"Know thyself" was the grand motto of the ancients.

It is still the watchword of a modern and progressive world.

By the knowledge of self we may master self, and by the improvement of self we may also improve mankind.

Mentality.—Mentality is the ultimate aim and goal of men and of all things on earth. Mental science, therefore, constitutes the embodied summary of all science.

Uses of the Science.—It is the purpose of this article to give the latest results of the researches of scientists in the subjects of phrenology, physiognomy and palmistry. Only by the study of these great subjects

can we thoroughly know ourselves. Without it we can never understand the natures of our children. Ignorance of it means ignorance of mankind.

Opponents of Human Science.—Ignorance is the father of opposition. No new discoveries were ever made that did not meet with opposition, and this opposition was strongest in those that knew the least about the new discovery. Columbus was bitterly persecuted for daring to suggest that the earth was round. Galileo took his opponents to the famous tower of Pisa and let fall at the same moment from its top two weights, a small and a large. Although these men saw both weights reach the ground at the same instant they refused to believe their eyes, and held fast to the old Aristotleian theory that the heaviest of two bodies would always drop to the ground first.

Opposition Without Weight.—The men who are the first to oppose a new science are those who are learned in another science, and because they are known to be wise, their opinion has great weight, although they may have devoted no study at all to the new science. Physicians, especially, are treated in this unreasonable way by the ordinary populace.

Readings of Character.—A man sees, perhaps, a strange experiment in hypnotism or he may have his character accurately read from his head, his face or his hand. He goes to his physician, and because that physician, who probably has never devoted five minutes' study to any of these subjects, pronounces such things impossible, the patient also refuses to believe in them. So he goes away and tells his acquaintances to pooh-pooh the idea, because Dr. So-and-so does not believe in it.

Human Mysteries.—It is recognized by all physicians that there are hundreds of mysteries in medicine as yet unfathomed. How much more is this so in regard to the mysteries of life and nature, which few have penetrated?

Growth of Hypnotism.—Not a great many years since almost every physician declared that hypnotism was impossible. To-day the medical profession recognizes hypnotism as one of its most important studies.

Importance of Palmistry.—For years doctors ridiculed palmistry. To-day they admit that diseases are indicated in a marvelous manner by the hand. Almost all medical men admit now that the different formations of nails indicate different diseases, and that it is possible from the nails alone to predict that the subject will suffer from heart disease, paralysis, consumption, and so on. So it is with physiognomy.

Detecting Ailment.—A disease often has what physicians call its

facies, an expression by which the trained eye can detect the character of the ailment.

Cheira says: "I respect doctors as a body of educated men; but I do not respect the idea that they should be the appointed judges of such matters as telepathy, mesmerism, clairvoyance, and so on, without any other qualification but that of having M. D. to their names."

What Doctors Can Tell.—How a doctor treats his patient and the way a phrenologist or palmist treats his client.

In the first place a doctor has a recognized science to go by. He has the experience of thousands of years back of him. Scientific instruments of precision and the most modern improvements are at his command. Yet how many can tell the patient what he is suffering from, unless the patient first tells the doctor all about himself and his symptoms? Even then the physician must often listen and feel and pound before he will express an opinion. And after all that, how often can the doctor arrive at a correct diagnosis? If the doctor makes a mistake, not much is thought of it, as we are all human and no man is infallible and no science is perfect.

What Phrenologists and Palmists Can Tell.—In the case of a phrenologist or palmist, however, the client, without giving his name, without telling his occupation, or whether married or single, simply exhibits his head or holds out his hands. The phrenologist or palmist then has to tell the past events in his life, present surroundings, health, past and present. Having, by accuracy only, gained the client's confidence, he proceeds to read the future from the same materials that he has told the past.

Now, if the palmist or phrenologist should make one mistake he is immediately considered by his client to be a charlatan and a fraud, and the science of mentality is regarded as a delusion and a snare.

Having, we hope, convinced our readers that it will be to their advantage to consider the subject of descriptive mentality we will now take up in detail each of its departments.

PHRENOLOGY

Organ of Love of Young.—Let the reader feel along the middle line, at the back part of the head, toward the base of the skull, and he will recognize a small bony projection. Below this point lies the organ of amativeness. Immediately above it, and on each side of the middle line of the head, lies the organ of the love of young, forming, generally, a single protuberance occupying both sides of the line. When very large it gives to the back of the head a dropping, overhanging appearance.

Development of the Organ.—Some people are very fond of children and others cannot abide them. Some abhor even their good-natured prattle, while others show toward them the utmost forbearance, and soothe their fretfulness with admirable patience and gentleness. Now, in all these cases, the strong manifestation of the feeling is accompanied by a large development of the organ, and a feeble manifestation of the faculty by a small development of the organ, the manifestation and the development being proportional.

Principles of Phrenology.—Gall established the following principles:

1. That the mental faculties are innate.

2. That the brain is the organ of mind.

3. That the form and size of the brain are distinguishable by the form and size of the head or skull.

4. That the mind possesses distinct faculties, and that the brain is composed of distinct organs, and that each mental faculty is manifested through a distinct organ of the brain.

5. That the size of each organ can be estimated during life; and that size, other things being equal, is the measure of power.

6. That each organ, when predominantly active, impresses the body with certain uniform attitudes and movements, called its natural language.

Grouping of the Organs.—The first division of the faculties of the mind and the organs of the brain is into three grand classes:

1. The propensities of animal organs;

2. The intellectual faculties, and

3. The moral or spiritual sentiments.

Location of the Groups.—These groups are so placed that the location of each indicates its work in the graded scale of functions.

Propensities.—The propensities are placed next to the spinal column, in the base of the brain and in close connection with the body.

Intellect.—Rising above these we come to the region of intellect.

Morality.—Above that, in the very top of the head, are the moral or spiritual sentiments, through which we are brought into relation with God.

Function of the Propensities.—The propensities give force and efficiency in all our actions, adapt us to our fellows, and lead us to take care of ourselves.

Function of the Intellectual Faculties.—The intellectual faculties enable us to obtain knowledge of men and things; to compare and arrange facts; and to invent and construct what we need for the practical application of our knowledge.

Function of the Moral Sentiments.—The moral or spiritual sentiments are meant to control all the rest by subjecting them to the tribunals of kindness, justice and the Divine Law.

Classes Divided Into Groups.—The grand classes of faculties and organs are divided into groups as follows:

Propensities.—1. The social group. 2. The selfish group.

Intellectual Faculties.—1. Group of the external senses. 2. The perceptive group. 3. The reflective group. 4. The literary group.

Moral Sentiments.—1. The selfish group. 2. The semi-intellectual group. 3. The religious group.

Social Group.—The social group has for its collective function the manifestation of those affections which connect us with country and home, and attach us to relatives, conjugal companions, family and friends.

Selfish Group.—The office of the selfish group is to make proper provision for the animal wants, and to secure the preservation of life, the defense of the person and the accumulation and protection of property.

The External Senses.—The external senses have for their appropriate work the conveying to the brain of intelligence concerning the world of material things outside of the brain itself, acting, therefore, in direct co-operation with the perceptive faculties.

The Perceptive Group.—The perceptive group, through the senses, brings man into direct communication with the physical universe, gives a correct judgment of the properties of things, and leads to the practical application of the knowledge obtained.

The Reflective Group.—The function of the reflective group is to analyze, compare and classify the facts collected by the perceptives and to philosophize, contrive, invent and originate ideas.

The Literary Group.—The literary group imparts memory, and the ability to communicate ideas and feelings by means of written or spoken words.

The Group of Selfish Sentiments.—The group of selfish sentiments gives regard for character, love of distinction, self-reliance, independence, stability and perseverance. They have an aspiring and governing tendency.

The Semi-Intellectual Group.—The semi-intellectual group has for its function self-improvement, and the love and production of whatever is beautiful. It is elevating and chastening in its influences, and acts in co-operation with the strictly religious group, to which it is closely allied.

The Religious Group.—The religious group has the highest office of all, and tends to elevate man into fellowship with angels, and beget aspira-

tions after holiness and heaven, while making him at the same time meek and humble—even as a little child—toward God. When large and active, and holding the leading place which belongs to it, all the other groups are sanctified through its action.

Division Into Organs.—Each of these groups is again divided into organs, designated by name and location on the head, and each indicative of some characteristic of the man or woman. Space will not permit a full classification and description of each organ as thus subdivided, but the general principles of phrenological science may be learned from a consideration of the organs of a single group; say, The Social Group.

Organs in the Social Group.—1. Amativeness. 2. Philoprogenitiveness (love of young). 3. Adhesiveness. 4. Inhabitiveness. 5. Continuity.

Amativeness.—"Be fruitful, and multiply, and replenish the earth, and subdue it."

Definition.—Love between the sexes; desire to marry.

Location.—Feel on the middle line toward the base of the skull, at the back part of the head, and you will feel a small, bony projection called the occipital process. Below this point and between two similar protuberances (the mastoid processes) behind the bottom of the ears lies the organ. Its size is indicated by the extension of the occipital swellings backward and inward of the mastoid processes, and downward from the occipital process.

Function.—The function or use of amativeness is to manifest sexual feeling, and give the desire to love and be loved and to marry.

Philoprogenitiveness.—"Can a woman forget her suckling child?"

Definition.—Regard for offspring, pets, and so forth.

Location.—About an inch above the occipital protuberance. When large it gives fullness to the back-head above amativeness.

Function.—To impart love for the young, and particularly for one's own children. It also leads to a fondness for pets generally. It gives a softness of manner in treating the feeble and the delicate, even in advanced life.

Friendship.—"The soul of Jonathan was knit with the soul of David, and Jonathan loved him as his own soul."

Definition.—Adhesiveness; sociability; love of society.

Location.—At the posterior edge of the parietal bone just above the lambdoidal suture. It projects at the posterior and lateral part of the head,

on each side of inhabitiveness, and a little higher than philoprogenitiveness, and when very large produces two annular protuberances there.

Function.—This organ gives the instinctive tendency to attachment and delight in the return of affection. It causes one to seek company, love society and indulge friendly feelings. Those in whom it is strong feel an involuntary impulse to embrace and cling to any object which is capable of experiencing fondness. It gives ardor and a firm grasp to the shake with the hand.

Inhabitiveness.—"The Lord forbid it me, that I should give the inheritance of my fathers unto thee."

Definition.—Love of home and country.

Location.—Between parental love and continuity, on the back part of the head. Where it is very large and continuity moderate, an angle is formed near the union of the lambdoidal sutures, between which and the occipital bone there will be considerable distance.

Function.—To give love of home and country, a desire to have a permanent abode, and attachment to any place where one was born or has lived.

Continuity.—"Let every man abide in the same calling wherein he was called."

Definition.—One thing at a time; consecutiveness.

Location.—Next above inhabitiveness and below self-esteem. When large it gives a general fullness to the region; and when moderate or small, a marked depression will be perceptible.

Function.—To give connectedness to thought and feeling, and thoroughness in elaboration of ideas or the working out of the details of any plan. Concentration.

Other Organs.—Among the other organs located and functionally described, and whose location, description and function go to make up the complete system of phrenology, are combativeness, destructiveness, acquisitiveness, approbation, self-esteem, firmness, hope, spirituality, benevolence, ideality, imitation, mirthfulness, individuality, form, size, weight, order, calculation, locality, time, and so forth.

PHYSIOGNOMY.

The real science begins with Camper. He discovered the famous facial angle which, to our own time, has served as a criterion and a measure to determine the rank of the human face. Many scientists since Camper

have devoted great study of physiognomy. Darwin, Mantegazza and many others have written famous works on the subject of expression.

Racial Expression.—It is interesting to note how the expression varies in different races and even in the same races. In the same races pastoral and agricultural people are less expansive in their expression; while the warlike, seafaring or trading nations have more mobile and expressive facial muscles because their life is less simple and less contemplative.

The Different Types.—Everyone knows the tranquil expression of the Oriental people, who await everything from God, and do not know the feverish activity of the Europeans.

The expression of the Frenchman is concentric, rapid and gay.

That of the Englishman haughty and stern.

That of the German heavy, benevolent and always ungraceful.

The Spaniard and Portuguese gesticulate little; their faces remain impassive.

Many Russian and Hungarian people do not look one steadily in the face, and have a very false expression.

The expression of the Scandinavian is hard and without grace.

Professional Expression.—Often on seeing a stranger we exclaim to ourselves, "This man must be a pharmacist! I bet that this is a priest or a disguised soldier! This other can only be a carpenter!" Many times these hazarded suppositions have been correct. The profession has a modifying influence on the expression of the face, and even on the character, on the health and many other inner and outer things.

The professions which most profoundly modify expression are those which daily exert a particular mode of muscular movement or of brain work. It is because of this that I recognize the druggist, the doctor, the carpenter, the priest and the soldier more readily than other members of society.

Judgments on the Face.—After looking at a human face we can nearly always formulate certain judgments relating to one of the five great problems which a human face presents.

1. Condition of health or of sickness.
2. Degree of beauty or ugliness.
3. Moral worth.
4. Intellectual worth.
5. Race.

The Healthy Look.—The healthy look is not difficult to detect. We all take great satisfaction at the sight of a picture of perfect health.

The Unhealthy Look.—The unhealthy look, on the other hand, may appear in a great variety of forms. Many times the outer aspect of the invalid, and especially of his face, suffice to make the nature of the evil guessed, and to put us on the way to a good diagnosis.

Special Functions.—There are some special functions where the particular nature of the sufferings is so faithfully inscribed on the face that it at once suggests to the observant doctor the diagnosis before any examination of the patient. The tuberculous, the asthmatic, the hypochondrical, the cancerous have a characteristic physiognomy and expression which everyone can recognize.

The Good Face.—The two most certain signs of a good face are the permanent expression of benevolence and the absolute absence of all hypocrisy.

Never to express either hatred, or cruelty, or passion, or rancor, or envy, or luxury, or debauchery—this is enough that a face may indicate a great fund of benevolence.

The good man is happy, and he expresses his serenity, his content in loving and being loved by a perpetual smile.

Another almost constant character of the physiognomy of goodness is to be frank, open to every emotion, incapable of hiding anything.

The good man, in fact, never distrusts others; he does not feel the need of withdrawing himself from an inquisitive observation.

The Evil Face.—The habit of hatred and of all vices which debase man and reduce him to the beast, impress sadness on the face, discontent, which reveals continual displeasure and a perpetual state of war against self and against others.

The contempt, the antipathy which the wicked excite, increases in them the rancor, the secret and incessant desire for vengeance which gives to the features of their face a sad expression.

A wicked face is always false. The cheat avoids the looks of others in his invincible fear that they may read within him.

The Intelligent Face.—Large head, beautifully oval. Wide, high and prominent forehead. Eyes large rather than small. Ears small or medium and beautiful. Face small and not very muscular. Not very prominent jaws. Large and prominent chin.

The Stupid Face.—Small head or very irregular. Narrow, retreating, smooth forehead. Eyes rather small. Large and ugly ears. Large and very muscular face. Prominent jaws. Retreating and small chin.

The Amative Face.—A prominent if not massive chin; a full neck;

breadth and fullness of the lips. Redness of the lips indicates present activity of the function. Absence of color indicates inactivity.

Face of Friendship.—Friendship (adhesiveness) holds fast, clings, adheres and is represented by the round muscle which surrounds the mouth and draws together or closes the lips. When this muscle is large and strong it produces slightly converging wrinkles in the red part of the lips, sometimes extending slightly into the white part.

Small perpendicular wrinkles in the red part of the lips indicate a smaller degree of friendship, but not a deficiency.

The Combative Face.—There is generally a marked enlargement of the neck below the back of the side-head. Prominence of the ridge of the nose is another sign.

The Acquisitive Face.—Persons noted for their love of gain and ability to acquire property are observed to have, as a general rule, massive noses, and it is believed that thickness of the nose above the wing is the true facial sign of acquisitiveness.

Face of Firmness.—The facial sign is the perpendicular straightness or convexity and stiffness of the centre of the upper lip.

This faculty has also one of its most striking indications in the size and strength of the bones of the neck and in the perpendicularity of the neck itself.

Face of Hope.—Hope elevates the centre of the eyebrow, opens the eyes wide and turns them upward. It gives an open and pleasant expression to the whole countenance.

The Spiritual Face.—Large and active spirituality gives a singularly elevated expression of countenance.

The Face of Benevolence.—The inner extremities of the brows are elevated, sometimes causing, when strong, short horizontal wrinkles in the centre of the forehead.

Face of Mirthfulness.—Mirthfulness shows itself on the face in a graceful turning upward of the corners of the mouth.

Language Face.—A large development of language is indicated by prominent eyes. Sometimes the eyes not only project but are also depressed, when the under eyelid presents a sort of sack or roll or appears swollen.

PALMISTRY, OR LANGUAGE OF THE HAND.

Divisions.—Palmistry should really mean the study of the hand in its entirety. It is, however, divided into two sections: the twin sciences of chirognomy and chiromancy.

The first deals with the shape of the hand and fingers and relates to the hereditary influence of character and disposition.

The second deals with the lines and markings of the palm and relates to the events of past, present and future.

Chirognomy.—There are seven types of hands, each of which may again be subdivided into seven varieties. The seven types are:

1. The elementary or the lowest type.
2. The square or the useful hand.
3. The spatulate or the nervous active type.
4. The philosophic or the knotty hand.
5. The comic or the artistic type.
6. The psychic or the idealistic hand.
7. The mixed hand.

Elementary Hand.—This hand naturally belongs to the lowest type of mentality.

Description.—In appearance it is coarse and clumsy with large, thick, heavy palm, short fingers and short nails. There are also very few lines to be seen on the palm.

Interpretation.—The people possessing such a type have very little mental capacity, and what they do possess leans more to the order of the brute. They have little or no control over their passions. Love of form, color and beauty does not appeal to them.

Thumb.—The thumb of such hands is short and thick with the upper part of nail phalanx heavy, full and generally square. Such people are violent in temper, passionate but not courageous. They possess a certain low cunning, but the cunning of instinct, not reason. These people are without aspirations; they but eat, drink, sleep and die.

The Square Hand.—The square hand means the palm square at the wrist, square at the base of the fingers, and the fingers themselves square. Such a type is called the useful hand because it is found in so many walks of life. With this type the nails as well are generally short and square.

Interpretation.—People with the square hand are orderly, punctual and precise in manner, not, however, from any innate grace of nature, but more from conformity to custom and habit.

They respect authority, they love discipline. They have a place for everything and everything is kept in its place, not only in their household but in their brains.

In work they have great application, force of character and strength

of will. They are sincere and true in promise, staunch in friendship, strong in principle and honest in business.

The Spatulate Hand.—The spatulate hand is so-called not only because the tip of each finger resembles the spatula that chemists use in mortars, but also because the palm, instead of having the squareness of the preceding type, is unusually broad either at the wrist or at the base of the fingers. When the greater breadth of formation is at the wrist the palm of the hand becomes pointed toward the fingers. When, on the contrary, the greatest breadth is found at the base of the fingers the shape of the hand slopes back toward the wrist.

Significance.—When hard and firm the spatulate hand indicates a nature restless and excitable but full of energy of purpose and enthusiasm. When soft and flabby it denotes the restless but irritable spirit. Such a person works in fits and starts but cannot stick to anything long. The peculiar attribute that the spatulate hand has is its intense love of action, energy and independence.

As a rule it is a large hand with fairly long, well-developed fingers. The most striking characteristic of all is the singular independence of spirit that characterizes individuals possessing such a development.

No matter in what grade or position in life these spatulate hands find themselves they always in some form strike out for themselves and assert their right to possess a marked individuality of their own. It is from this hand that we get not only our great discoverers and engineers, but also the whole army of men and women we are pleased to call cranks, simply because they will not follow the rut made by the centuries of sheep that have gone before them. They will break all rules of precedent, not by any means for the sake of eccentricity, but simply because they have an original way of looking at things, and their sense of independence inclines them to resent suiting their brain to other people's ideas.

The Philosophic Hand.—This shape of hand is generally long and angular with bony fingers, developed joints and long nails. People with such a type are, as a rule, students, but of peculiar subjects. They study mankind. They like to be distinct from other people and they will go through all kinds of privation to attain this end. Such people love mystery in all things. In character they are silent and secretive. They are deep thinkers, careful over little matters, even in the use of little words. They are proud with the pride of being different from others. They rarely forget an injury but they are patient with the patience of power. They wait for opportunities and so opportunities serve them. Such hands

are usually egotistical, which is in keeping with the life they lead. When in any excess of development, they are more or less fanatical in religion or mysticism. With these hands it must be borne in mind that the developed joints are the peculiar characteristic of thoughtful people, while the smooth, pointed fingers are the reverse.

The Conic Hand.—The conic hand is medium-sized, the palm slightly tapering and the fingers full at the base, and conic, or slightly pointed, at the tip or nail phalanx.

The main characteristics of the conic hand are impulse and instinct. There is a great variety in connection with this type but it is more usually found as a full, soft hand with pointed fingers and rather long nails.

Such a formation denotes an artistic, impulsive nature, but one in which love of luxury and indolence predominate.

The Psychic Hand.—The most beautiful but the most unfortunate of the seven is what is known as the psychic hand. It is in formation long, narrow and fragile looking, with slender, tapering fingers and long, almond-shaped nails. Individuals with the psychic hand have the purely visionary, idealistic nature. They appreciate the beautiful in every shape and form. They are gentle in manner, quiet in temper. They are confiding and they instinctively trust anyone who is kind to them.

They have no idea of how to be practical, business-like or logical. They have no conception of order, punctuality or discipline. They are easily influenced by others.

Color appeals to this nature in the highest possible way.

This type is unconsciously a religious one. It feels what is true but has not the power to seek truth.

These individuals have the intuitive faculties highly developed.

The Mixed Hand.—The mixed hand is so-called because the hand cannot be classed as square or spatulate, and so forth; the fingers also belong to different types.

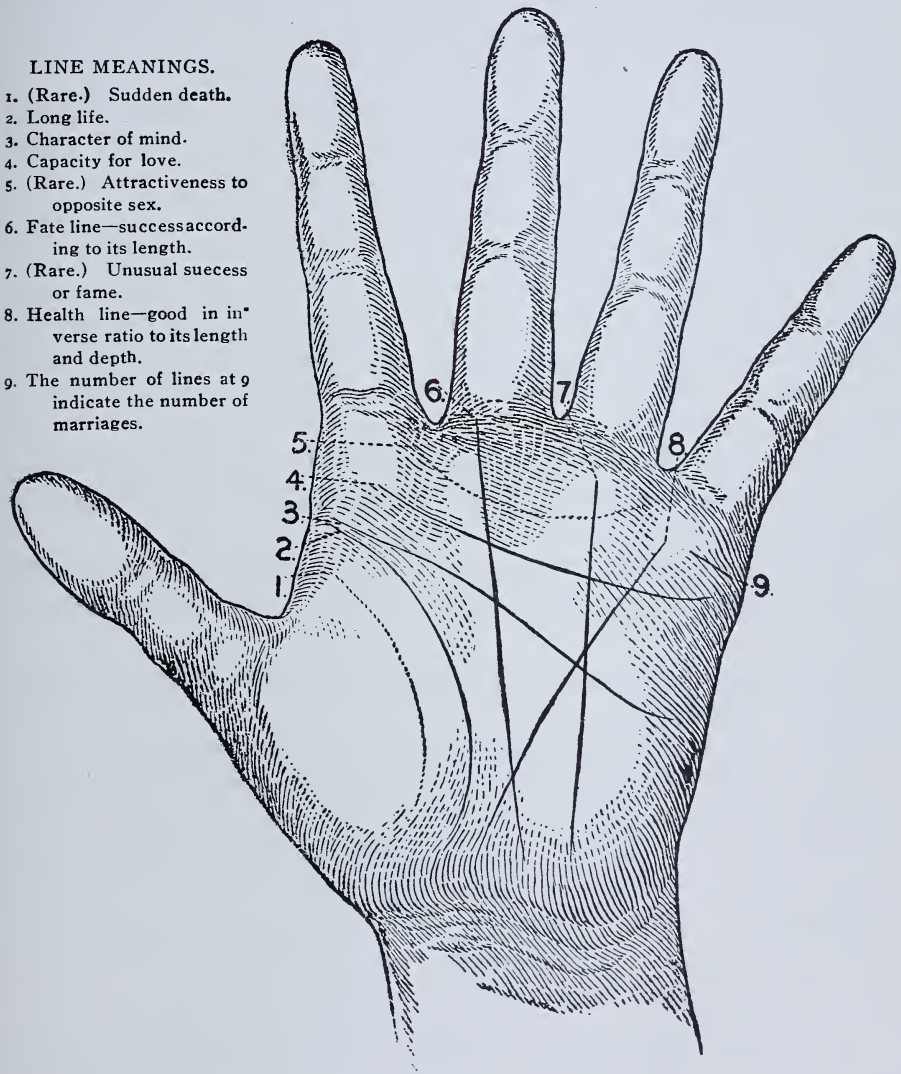
The mixed hand is the hand of ideas, of versatility and generally of changeability of purpose. A man with such a hand is adaptable to both people and circumstances, clever but erratic in the application of his talents.

He will be brilliant in conversation, be the subject science, art or gossip. He may play some instrument fairly well, may paint a little, and so on. But rarely will he be great.

When, however, a strong line of head rules the hand, he will, of all

his talents, choose the best and add to it the brilliancy and versatility of the others.

Such hands find their greatest scope in work requiring diplomacy and tact.



CHARACTER LINES OF THE HAND.

They are so versatile that they have no difficulty in getting on with the different dispositions with which they come in contact.

Their most striking peculiarity is their adaptability to circumstances. They never feel the ups and downs of fortune like others. Almost all classes of work are easy to them.

They are generally inventive, particularly if they can thereby relieve themselves of labor. They are restless and do not remain long in any town or place. As they are always changing and unstable as water, they rarely succeed.

The Thumb.—The long, well-formed thumb denotes strength of intellectual will. The short, thick thumb brute force and obstinacy. The small, weak thumb, weakness of will and want of energy.

The Fingers.—Long fingers give love of detail in everything. Short fingers are quick and impulsive. They cannot be troubled about little things. They take everything *en masse*. They generally jump at conclusions too hastily. They do not care so much about appearances or for the conventionalities of society. They are quick in thought and hasty and outspoken in speech. Fingers thick and clumsy as well as short are more or less cruel and selfish.

When the fingers are stiff and curved inward, or naturally contracted, they denote an excess of caution and reserve and very often indicate a cowardly spirit.

When they are very supple and bend back like an arch they tell of a nature charming in company, affable and clever, but curious and inquisitive.

The Palm.—A thin, hard, dry palm indicates timidity and a nervous, worrying, troubled nature.

A very thick palm, full and soft, shows sensuality of disposition.

When the palm is firm and elastic and in proportion to the fingers it indicates evenness of mind, energy and quickness of intellect.

When not very thick, but soft and flabby, it denotes indolence, love of luxury and a tendency toward sensuality.

Lines of the Hand.—There are seven important lines on the hand and seven lesser lines. The important lines are:

The Line of Life, which embraces the Mount of Venus.

The Line of Head, which crosses the centre of the hand.

The Line of Heart, which runs parallel to the above, at the base of the fingers.

The Girdle of Venus, found above the line of heart and generally encircling the Mounts of Saturn and the Sun.

The Line of Health, which runs from the Mount of Mercury down the hand.

The Line of Sun, which rises generally on the Plain of Mars and ascends the hand to the Mount of the Sun.

The Line of Fate, which occupies the centre of the hand from the wrist to the Mount of Saturn.

The seven lesser lines are:

The Line of Mars, which rises on the Mount of Mars and runs within the Line of Life.

The Via Lascina, which lies parallel to and outside of the Line of Health.

The Line of Intuition, which extends like a semi-circle from Mercury to Luna.

The Line of Marriage, the horizontal line on the Mount of Mercury.

The three bracelets found on the wrist.

BOOK XVI

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Book XVI

SELF CARE FOR WOMEN

HEALTH IN RELATION TO BEAUTY.

The Cultivation of Beauty.—It is natural for every woman to desire to be beautiful and attractive. This desire should not be frowned upon as an indication of vanity or frivolity, for it is the expression of a sound and healthy instinct. It is not only right and proper that women should desire to be beautiful, but it should be the duty of every woman to be just as attractive as her physical and mental endowments will permit.

Beauty is normally an indication of health. It means a wholesome state of body and mind and this in turn means fitness for wifehood and motherhood. It is a part of the great plan of Nature that women should be attractive.

But is beauty a matter of cultivation? Can it be developed? We are told that poets are born and not made. Is the same true of the quality of beauty? Or can all women make themselves attractive and fair to look upon?

There is no question that some are more favored by nature than others. It would be folly to deny this. It should be said, however, that the differences between women in this respect should be simply a difference in the degree of beauty rather than the difference between beauty and ugliness. Ugliness is entirely foreign to the nature of woman. The truth is that Nature intended all women to be attractive, even though there may be differences in the degree of comeliness. Beauty depends upon various factors in the way of contour, coloring, skin texture, the expression, the mental state and the suggestion of vitality in the features and body as a whole. All of these factors may be lacking in a given case, and may always be improved by cultivation of the right kind. In short,

beauty is a potentiality in the case of every woman and needs only to be developed and realized by proper cultivation of the different factors and qualities upon which it depends.

Beautiful Features.—There is one factor that goes to determine the beauty and outlines of the face which is practically beyond our power to control, and that is the fundamental conformation of the skull and face giving us our characteristic features. There is no question that some are naturally gifted with greater symmetry in this respect than others. In one case the outlines are perhaps more harmonious than in another, but beyond this question of features it can hardly be said that any one has any important natural advantage over another in the matter of personal appearance.

Furthermore, when one stops to analyze the part played by the features in determining facial beauty, it immediately becomes apparent that even this factor is greatly over-rated.

For the features alone do not make for beauty. It is only the touch of health, vitality and good coloring that can make them attractive; and where there is health, vitality and intelligence, all features and all faces are attractive or even beautiful.

Just how little the features amount to as a means of giving one beauty will be seen from a study of the same face under conditions of health and ill-health. In the latter case the appearance may be drawn, haggard, hopeless and altogether unattractive, while under conditions of health the features will be properly filled out, smoothly modeled and well colored, with the expression animated in such a way as to provide that elusive quality which we term beauty. Consider the features in youth and in age. On the one hand we have the bloom and glory of youthful beauty, and at the other extreme we have the withered, faded and altogether ugly aspect of age. Note that the features remain the same. It will be seen, therefore, that the question of beauty depends not upon the features, but upon the manner in which they are "dressed up" by flesh and blood. Good features without health and coloring signify nothing. On the other hand, the features of any woman that lives, when marked by the bloom of health, suggestive of vitality and youth and bodily vigor, and expressive of intelligence and personality, will become both attractive and beautiful.

Health the Foundation of Beauty.—From what we have just said it will already have been made clear that the one indispensable factor in the cultivation of beauty is health. Men may strive for fame and fortune, and may fail; but the woman who strives for beauty and follows

the proper natural methods for attaining health, will succeed. Beauty expresses internal harmony and well-being. Beauty means pure, rich blood, a condition of internal bodily cleanliness, active circulation, good nutrition as a result of faultless digestion, and perfect bodily functioning. In short, beauty is a quality that necessarily follows upon a conditon of strength and physical efficiency.

The woman who would make herself attractive, therefore, in the very beginning cannot do better than make a careful study of the section on "Physical Development for Women." She should avail herself of every possible means of building increased vitality; she should particularly get as much sleep as she can; she should spend as much time as possible out-of-doors; she should keep her blood pure through wholesome food and the drinking of plenty of pure water; she should dress sensibly and healthfully; and last but not least she should maintain a serene state of mind. There is no question that the mind has an important influence not only upon the health, but especially upon facial beauty. And particularly a woman's usual or prevailing attitude of mind, being an expression of personality, has everything to do with making her attractive or the reverse.

Youth and Beauty.—It is a matter of common observation that youth is a period of beauty, and that beauty fades with advancing years. This only emphasizes the great truth that beauty is really a matter of health and vitality. The fact is that to preserve beauty it is simply necessary to preserve the condition of youth. Youth is a matter of condition rather than of years, and if one will maintain the vitality, physical energy, good circulation, healthy red blood and vivacity of youth, she will retain with it the attractiveness of youth. When a woman gazes sorrowfully into the mirror at a plain and unattractive face, now faded, it simply means that she has suffered in the way of physical deterioration. She has lost her youthfulness or is rapidly losing it. What she needs is not cosmetics. She cannot buy beauty in a bottle. She must restore the condition of vitality, good nutrition, active circulation and pure blood, and this is entirely a matter of physical culture, sleep, fresh air, sufficient rest and freedom from nerve-destroying influences.

When your friend tells you that you are "looking good," she really means that you are truly "good looking," for the health that is manifest in your appearance has made you at the same time pleasing to look upon.

CONTOUR OF FACE AND BODY.

We have already referred to the uselessness of good features as a factor in beauty when they are not properly covered by healthy flesh. The first essential to beauty, even more important than the texture of the skin, is a pleasing contour. The bodily structure and the facial conformation must be properly filled out with good, healthy flesh. This means, in the case of the body, a normal, muscular development made smooth with a moderate covering of fatty tissue. The same thing applies to the face. There are muscles of the face which should be healthy and well developed in order to give character to the face. These muscles are well developed in the case of children and healthy young people, and they give not only character but firmness to the flesh. These muscles are covered by a smooth distribution of fatty tissue, and just beneath the skin there is a considerable amount of connective tissue which helps to give the skin firmness and smoothness. It is largely the breaking down of this connective tissue that produces wrinkles, although the loss of fatty tissue in age is likewise still further conducive to the formation of "lines." All of these tissues in youth and health are properly built up and give the face that harmony of outline and delicacy of contour which make for beauty.

A fat face is not attractive; only a firm plumpness of the cheeks is desired. Well-modeled features mean a condition of vigor, good nutrition and good circulation, and anything that is conducive to health would improve one in this respect. The haggard appearance of one suffering from the results of disease, overwork or dissipation is directly due to the breaking down of many cells, imperfect circulation and the weakening of the muscles, as a result of which there is a sagging down of the flesh. The characteristic of age is not so much the formation of lines, but the sagging down and shrinking of the structures of the face. One may have many fine lines and still retain the appearance of youth, so long as this drooping of the muscles and tissues of the face is not in evidence. Or one may have very few lines and yet the aspect of age is given unmistakably by this very sagging down of the cheeks and other parts.

Facial Massage.—Massage is usually the first measure advised by the beauty specialist as a means of improving the face. Naturally, massage affects not only the skin itself, but the underlying structures. There is no question as to the value and effectiveness of massage of the body. It promotes the circulation and yields a form of passive exercise. It is in-

dispensable in certain cases where exercise is impossible. But in the treatment of the face the value of massage is not so apparent. It may produce gratifying temporary results because of the improved circulation and momentary coloring induced. There is no question, also, that for the time being it tends to remove "lines" to some extent and improve the appearance. At the same time, facial massage is likely to be ultimately detrimental for the reason that it involves too much the breaking down of the connective tissue underneath the skin. By pulling and stretching the skin and the flesh one way and another, the connective tissues are weakened or partially destroyed and the result will be the formation of more lines and a tendency toward sagging of the flesh. Therefore massage cannot in all cases be recommended and particularly not for those who have already passed the years of youth, or, if employed, massage should be very carefully and intelligently administered.

The greatest mistakes in facial massage are too much stretching and pulling down of the tissues. There should be no downward strokes employed upon the face, and there should be no movements which tend to place the skin upon stretch to any extent. The most satisfactory form of facial massage, accordingly, would be something in the nature of pressure applied with the finger tips or with the heel of the hand or ball of the thumb, especially in the form of small, circling movements. This pressure should be applied for a few moments only and then relieved. The relaxation of the parts will permit a new supply of blood to flow into the tissues, whereupon the massage may be continued. A rotary movement of this kind covering a circle not larger than that of a ten-cent piece would be very satisfactory. In massaging the forehead, the finger tips may be used satisfactorily. For the cheeks, the eyes and directly underneath the eyes, an effective treatment would be to press the ball of the thumb upon the skin for a moment with a slight circling movement. Where there is already a tendency toward the sagging of the flesh, upward strokes may be used.

Where there are wrinkles, massage should take the form of strokes in line with the wrinkles. By massaging across the wrinkles, one only tends to make them deeper.

Facial Exercise.—Of greater value than massage in most cases is facial exercise or, in other words, the active use of the muscles of the face. These muscles are used in laughing, in crying and in all expressions of the face. A system of exercises for the face, therefore, may be devised by simply "making faces" at yourself in front of a looking glass, just as you somtimes liked to do when you were six years old. It sounds very foolish,

but it is the most effective means of regularly and thoroughly bringing into play the facial muscles. The improvement in these muscles and the better circulation helps greatly to beautify the face. Children whose faces are often wrinkled and distorted in laughing and crying have beautifully smooth faces. Actors and actresses whose facial muscles are continually employed in the expression of simulated emotions of various kinds, frequently retain their facial attractiveness and even youthful appearance far beyond the age at which most other men and women commence to look old. Clergymen and orators whose facial muscles are used in forcible expressions are often exceptionally good-looking men.

Once each day, therefore, it will profit one to take five or ten minutes during which to concentrate on facial exercises. The muscles of every part of the face should be brought into action, stretching them, contracting them, opening the mouth wide or yawning, then pinching the lips together, opening the eyes wide, then squeezing them together, raising and lowering the eye-brows to the limits of possible motion and drawing the mouth first to one side, then far to the other. Thrust the tongue into the cheek on each side, assume laughing and crying expressions, simulate horror and express as great a variety of other emotions as possible. Finally, simply make faces at yourself in the glass, just as children do, and you will find when you are finished that your face partakes of a sensation of life and energy. If persisted in, these facial exercises will accomplish a great deal.

Sleep.—There is nothing in the world that will take the place of sleep as a beautifier, and especially sleep in the early part of the night. There is a good reason why the term "Beauty Sleep" has been applied to the hours before midnight. Pay no attention to the theorist who tells you that many people sleep too much. If you sleep in the fresh air, either outdoors or with windows wide open, and without too much covering, it is impossible to sleep too much. There is nothing that you can do in the form of beauty culture than can possibly be of value if you do not allow yourself sufficient sleep.

CARE OF THE COMPLEXION.

Improving the Skin.—A beautiful complexion depends chiefly upon two factors, the coloring and the texture. Fortunately in most cases the same measures are effective in improving the skin in relation to both color and texture. A perfectly healthy skin is smooth as satin and pleas-

ing in color. Local care of the complexion is of great value and the suggestions we are offering will be very helpful in all cases, but it must be understood that constitutional measures are far more important than any local care. In other words, a good complexion depends upon the state of health and of the blood. A good complexion is indicative of health and is seldom possible without good health. Vigorous digestion, active circulation and rich, red blood are conducive to beauty of the skin, and without these fundamental requisites one cannot accomplish much by external means.

Granting, however, that the health is fairly good and the blood supply normal, a great deal can be done to improve the condition of the skin by proper care. Do not be misled into the notion that you can buy beauty at the drug store. Highly advertised cosmetics are of little value and in some cases are actually dangerous. The more simple home remedies used in the days of our grandmothers are far more effective and reliable than the innumerable highly priced and widely advertised preparations recommended by the druggist. Infinitely better results, if one wishes local applications, can be secured by the use of buttermilk, lemon juice, fresh milk, mutton tallow and other articles of common household use. Cold water offers a cosmetic infinitely superior to anything that has ever been placed on the market. Paints and powders are not only injurious in many cases, but they fail to produce the appearance of a healthy and beautiful skin. No matter how skilfully applied, there is always the artificial aspect of the skin, and the face so treated never can compare with a beautiful natural complexion.

Washing the Face.—There is nothing so good for the complexion as cold water. Use plenty of it. Use it several times a day.

There is nothing worse for the complexion than hot water. Never use it.

Hot water and soap, while producing a temporary effect that may be gratifying, will invariably be detrimental in the long run. The heat relaxes the blood vessels, causing them to lose tone, and especially opens the pores. Furthermore, heat stimulates the secretions of the oil glands or sebaceous glands, and in the case of an oily skin or one subject to blackheads and pimples, hot water is particularly detrimental. Steaming the face, a method commonly used by beauty specialists, is likewise detrimental for the same reason.

Strong soaps should never be used. A pure castile soap is usually to be preferred, and the face should be washed with luke-warm or cool

water, using a very small amount of the castile soap. It should, further, be very thoroughly rinsed with cold water, so that all traces of the soap will be completely removed. Do not pull and stretch the skin too much when washing, but use a soft cloth and wash the face gently, with mild friction.

Cold compresses may be advantageously applied to the face, using a small towel for the purpose or a wash cloth and using water just as cold as possible. This is a tonic of great value.

In drying the face, do not rub too vigorously with the towel but gently pat the skin until dry. The reason for this is the same as the objection to massage, namely, that too much pulling and stretching weakens or loosens the connective tissue beneath the skin.

Ice as a Cosmetic.—If cold water is valuable for improving the complexion, ice is even more effective in most cases. It has a wonderful tonic effect and not only closes up the pores, but improves the circulation and the general health of the tissues. It will pay one to take a piece of ice and move it about over the face for two or three minutes, at least once each day. The result will be a glow which will last for hours in some cases, and you will enjoy a feeling of life in the skin that will be gratifying. If the bare ice seems a little too severe, a cloth or towel can be wrapped around it. Do not try it if subject to neuralgia.

For one who lacks color, a treatment of this kind is much more satisfactory than an attempt at "painting." In certain "beauty parlors" a temporary glow of the skin has been produced by the application of a chemical preparation which leaves the skin red for some time afterwards. This, however, is only a state of inflammation accomplished by a poisonous irritant, and needless to say such methods are very destructive in the long run. The ice treatment will produce better results without any injurious after-effects. If one is particularly lacking in color, the alternate use of hot and cold water, with a final application of ice, will be particularly effective in this direction, but, except for an emergency, the hot water should not be used in this way. In many cases, however, a woman may thus secure a pleasing color which will endure throughout the entire evening at some social affair.

Oily Skin.—Many women complain of oiliness of the skin. This is the result of excessive activity of the oil glands or sebaceous glands. These must not be confused with the sweat glands. The sebaceous glands are located chiefly on the face, neck, shoulders, chest and back, and it is consequently mostly on these parts that pimples and blackheads are located.

These glands usually do not become active before puberty. Up to the age of twelve or fourteen the skin is smooth and clear. In the case of some women the sebaceous glands never become very active and they retain the "baby skin" through maturity. From puberty on, however, and especially in youth, all of the glands of the body are very active, including the sebaceous glands, and an oily complexion is often the result. In such cases hot water should be avoided except to the extent that one takes a full warm bath once or twice a week followed with a cold sponge. Cold water and ice tend to check the activity of the sebaceous glands and also to contract their pores or ducts.

Blackheads and Pimples.—When the pores or ducts leading from the sebaceous glands to the skin are clogged or closed in such a way that the oil cannot be poured out upon the skin, the oil accumulates, forming what is known as a "blackhead" when the duct is clogged and blackened with dirt, as is frequently the case. When squeezed out, the blackhead appears in the form of what is often called a "flesh worm," but it is really only the hardened and accumulated secretion of the gland. When there is inflammation at the same time, a pimple is formed. "Acne" is the technical name of the so-called disease represented by a large number of pimples. A pimple is usually the result of a mild infection which travels down the duct of a sebaceous gland or sometimes down the root of a hair.

Any treatment tending to overcome oily skin would likewise tend to overcome blackheads and pimples. Cleanliness is of great importance, especially in preventing the infection and mild inflammation which causes pimples. Cold water and ice are of great value, while some harmless astringent such as lemon juice, borax or benzoin is often quite helpful.

Squeezing and pinching blackheads is not advisable because of bruising the tissues and leading to inflammation and the formation of pimples. A small blackhead remover, which you can buy in a drug-store, will be much better, or one may use an old-fashioned watch key, pressing around the blackhead until it slips out with the least possible irritation. In a serious case of blackheads, a preliminary steaming of the face, or washing with hot water and soap to open the pores, may be permitted, whereupon the blackheads can be more easily removed. Thereafter, however, no hot water or steam should be employed. A solution of common washing soda, a teaspoonful to a pint of water, will soften the blackheads for removal, but it is very irritating to the skin, and should be thoroughly sponged off immediately, afterward applying cold milk. A gentle friction of the skin with the dry bare hand, improving the circulation, and a

plentiful use of cold water for improving the skin generally, are particularly recommended in the case of pimples or acne. In opening a pimple, the part should always be thoroughly cleansed with an antiseptic. Peroxide of hydrogen is fairly satisfactory, although listerine and other standard antiseptics will answer the purpose.

Enlarged Pores.—Enlarged pores are usually found in connection with an oily skin and particularly require persistent treatment with cold water or ice. These are not the sweat-pores. Cold creams are especially undesirable in such cases. A good astringent to help close the pores would be a tablespoonful of tincture of benzoin to a quart of water. Lemon juice sponged upon the skin is also very effective, but should be washed off with cold water or sponged off with milk in two or three minutes. Although we have mentioned astringents, they should be used simply as an emergency treatment and not habitually. Their continued use will always prove detrimental.

Dry Skin.—An unusually dry skin is the result of a lack of oil or inactivity of the sebaceous glands. When much soap is used in such cases, abstracting the limited amount of the natural oil, the condition becomes aggravated. The use of hot water with soap is highly detrimental. Those having a very dry skin should be extremely careful in the use of soaps, and even more than usually careful not to use patented preparations for the skin, many of which are irritating and astringent in character. The possessor of a dry skin should use just as little soap as she possibly can, and use only cold water for cleansing purposes. The use of a little cocoa-butter or refined olive oil might even be advantageous to supply the deficiency.

It is in cases of this kind that a real "cold cream" would be unobjectionable, but it is not wise to buy it in the open market because of the various unsatisfactory formulas used. A cold cream that is a real "grease" cream, and especially if it has mutton tallow as its basis, would be advantageous, but those containing mineral oils are detrimental and might cause the growth of hair. The use of the original mutton tallow, a good, old home-remedy, would be infinitely better than any perfumed cream. Many so-called "cold creams" are not cold creams at all, but astringent preparations, and should be carefully avoided. This usually applies to so-called "peroxide" creams. The theatrical cold cream, although cheaper in price, is usually a real grease cream and probably superior to the high priced preparations sold for cosmetic purposes. The

theatrical cold cream is used simply to protect the face from the grease paint and powder used in "making up."

Cold Cream for Cleansing Purposes.—Those having very dry skins and who cannot therefore use much soap, will find the use of a pure cold cream or theatrical cream advantageous for cleansing purposes. Simply rub the cream well over the face and then rub off thoroughly with a soft cloth. This will remove the dirt with the cream. Never use a rough cloth for the purpose.

Chapped Skin.—Dry skins, when improperly cared for, are liable to become chapped, especially when too much soap is used and when the skin is exposed to harsh winds and cold weather. The best preventive of chapping is to thoroughly dry the skin after washing, before going outdoors. Mutton tallow is especially recommended for this condition, though olive oil and cocoa-butter are both excellent. A half and half mixture of glycerin and rose water, with a bit of benzoin added, is always an effective treatment for chapped lips or chapped hands, to be applied before going to bed.

Sun and Air.—The effect of sunshine and air upon the skin is generally beneficial. Those who are anemic or whose complexions are pale should especially get a certain amount of sunshine every clear day. Sunshine stimulates the formation of red blood corpuscles. Besides the effect of the sunshine in tanning the skin or developing pigment, it actually increases the undertone of red coloring which indicates health.

In the case of very thin and delicate skins, however, too much wind and too much sunshine may be detrimental from the standpoint of the complexion, even though the air and sunshine may be beneficial to the general health. The blonde and thin-skinned man or woman too much exposed to the sunshine acquires a dried and wrinkled appearance of the face along with the heightened color. While one cannot get too much outdoor life, yet such persons should protect their complexions from too much direct exposure to the summer sun in the middle of the day.

Flesh Brushes.—One of the most beneficial treatments of the skin that can be suggested is the use of a soft flesh brush, by means of which to give the face a gentle friction. The brushes should be sufficiently soft to be comfortable on the face and to avoid scratching. Such friction of the entire body is of great health value, but when applied to the face it tends to develop a soft, smooth texture.

Itching Skin.—In most cases itching skin is simply an aggravated conditon of dry skin, and the annoyance usually follows a bath in which

too much soap is used. It can be relieved by rubbing the skin thoroughly with a very little olive oil or cocoa-butter following the bath. Air baths and friction baths are especially valuable. The use of buttermilk is often advantageous.

Red Face.—A red face, although usually accompanied by a thin-skinned condition, in most cases represents imperfect circulation. Where the circulation is properly distributed, this conditon never appears. Plenty of muscular exercise, improved digestion, the use of less meat, more fruit and the drinking of more water will usually correct this tendency. Outdoor life is advised. Frequent washing of the face with cold water will be beneficial.

Red Nose.—This conditon, like redness of the face, indicates imperfect circulation. Exercise and improved general health are necessary. Massaging and rubbing the nose, together with application of ice, will be helpful. It is entirely a question of improving the circulation.

Pale Face.—The lack of color in the face indicates an anemic condition and calls for the building up of the general health. More sunshine is especially necessary, together with outdoor life in general, long walks, games and exercises, plenty of sleep and improved nutrition. The use of eggs, milk and fresh meats in the diet, balanced by a liberal use of fruits and green vegetables, can be recommended.

Wrinkles.—The formation of wrinkles is due usually to the breaking down of connective tissue beneath the skin, although lack of nutrition generally and the distortion of the face through the expression of various mental states are important factors. Improved health and better nutrition cause these lines to disappear. Massage is suggested, rubbing in the same line as the wrinkles themselves, but never across them. The flesh brush may be used the same way. The improved circulation due to the use of cold water or ice on the face, tends to overcome these lines. A serene mental attitude has a great deal to do with them.

As a local application, the most effective treatment will be to use strips of soft linen cloth, dipped into the raw white of an egg. These should be placed upon the face where the wrinkles are located, smoothed out carefully and allowed to remain for some time. Another suggestion is to mix equal parts of alcohol and the white of an egg, spreading upon the forehead and binding with a bandage or compress.

Freckles.—Although sometimes undesirable, freckles are not abnormal and are usually indicative of vigorous health. It is better to have freckles and have the good health that goes with them, than to be deprived

Book XVII

PHYSICAL CULTURE AND BODY BUILDING

PART 1.

EXERCISE NECESSARY TO HEALTH.

Why Exercise is Beneficial.—There is a general impression in many circles that exercise or physical culture is merely a means of developing muscular strength. There is also a general impression that in this age brain is more important than brawn. Consequently, those who view the subject of body-building from this narrow viewpoint are not likely to take physical culture seriously.

The great truth is that physical culture is not simply a means of building strong muscles, for it is also a means of improving health and building vitality. Even brain work requires energy. Physical culture is a means of building not only muscular vigor but functional strength, organic strength and nerve strength. Muscular power in many cases is desirable for its own sake, but for the average man and for the average women exercise is chiefly valuable not for the sake of strength but for the sake of health. Let this point be made clear, with all possible emphasis.

The basis of every healthy life is activity. There can be no such thing as health without muscular action. Man is fundamentally an animal. He is much more than this, but this he is first of all, and should be a perfect representative of animal life. In the days of the cave man the ordinary requirements of life were such as to keep one physically active and strong. The preservation of life depended upon strong limbs, a clear eye, agility and speed of movement, with perfect control of every muscle of the body. Men in the stone age did not need physical culture. They lived it all the time. But civilized man, with his sedentary occupations and limited physical activities needs special forms of exercise to keep him strong and vital.

Brains are indispensable these days, but bodily strength is also necessary to stand the stress and nerve-strain of modern life. The man of to-day should represent a combination of brains and brawn, for never was life so trying as at present. Never was a strong constitution more necessary.

Importance of the Muscular System.—You could not speak, you could not open your eyes, you could not adjust or focus the sight, you could not breathe, your heart could not beat, you could not digest your food, you could not laugh or cry, you could not walk, you could not dress, you could not even crook a finger without muscular action. The muscles should be regarded as organs of the body just the same as any other organ, for they are organs of movement.

Exercise is absolutely essential to health because of the physiological relation of the muscular system to the rest of the body. For over two-fifths of the bulk of a normal body is made up of muscular tissue. The nutrition of such a large part of the body is therefore an important matter. Most of the food we eat is consumed by the muscles, and most of the heat in the body is produced by them. It is apparent that to neglect the muscular system, therefore, means to derange the harmonious balance of all bodily functions. Exercise is beneficial because of its influence upon the appetite through the increased demand for food. It is beneficial because of its influence in promoting a vigorous and active circulation of the blood. It stimulates functional activity in all the internal organs. It causes deep breathing, thereby promoting health of the lungs, increasing the supply of oxygen upon which all life depends, and facilitating the removal of carbonic acid gas. Furthermore, it stimulates the elimination of all wastes and poisons through the kidneys and the pores of the skin. Muscular stagnation means stagnation in all of these functions as well, and under such conditons it is not possible to maintain a high degree of health.

Physiological Effects of Exercise.—Muscular activity brings about increased metabolism or cell-activity. There is a breaking down or wearing out of the cell structures, resulting in the formation of waste products and in the subsequent rebuilding of new cells. Strength may be increased and the muscular structures themselves developed by daily and persistent exercise which involves these changes. The formation of new cells is stimulated by the demand for greater strength in the muscles, and it is because of this fact that body building becomes an easy possibility. In fact, the muscles represent the only tissues in the body which we can in-

of sunshine. Chemical preparations for eradicating freckles are not only unreliable but injurious, and should never be used.

The most effective treatment for freckles is lemon juice. This should be removed with a little milk after five minutes to relieve any irritation. Buttermilk is sometimes useful for the same purpose. Peroxide of hydrogen may be used. A lotion consisting of one ounce of lactic acid, one ounce of glycerin and six ounces of rose water may be applied with cotton two or three times a day.

Sunburn.—There is probably nothing better than plain olive oil to relieve ordinary cases of sunburn. Cocoa-butter may likewise be used. In extremely severe cases, probably the best treatment will be the use of cold wet compresses. To prevent the compresses from becoming dry, cold water may be sprinkled upon them frequently.

Cosmetics and Powders.—Every woman should prefer a good natural complexion to an artificial complexion. The use of cosmetics of all kinds, even if they were temporarily effective in improving the appearance, which usually they are not, inevitably have the result of injuring the complexion. The woman with an originally good complexion will find in a few years that she has ruined it.

The only excuse for anything of the kind is to be found occasionally in the case of an oily skin, in which instance the use of a little powder to overcome this condition, especially so far as the nose is concerned, is not objectionable. Many powders, however, contain injurious and poisonous ingredients. Many of them are seriously irritating. The best application, therefore, is pure rice-powder, and it would be well if the application of this were confined to the nose itself.

Following are a few remedies of special value in the way of natural cosmetics:

Milk.—Either fresh milk or sour milk may be used for washing the face, with the very best results. Fresh cream is infinitely superior to any "cold cream" ever devised. Buttermilk makes a very good skin whitener in many cases for either face or hands. Those who suffer from dry skin may frequently benefit by using fresh milk entirely for washing the face. A half cup of milk or less will be sufficient, when using a good face cloth for the purpose.

Salt.—Salt has a wonderfully stimulating and tonic effect upon the skin. One may put a handful of sea-salt or of ordinary table salt in the bath with advantage. The washing of the face with cold salt water, then

rubbing gently with the bare hands until dry instead of using a towel, will have a very good effect.

Another good plan is to take a little salt in the hands, moisten it only slightly and then rub the face or even the skin of the entire body with it. It can then be rinsed off with cold water. The effect is delightful.

Lemon Juice.—Fresh lemon juice is one of the most valuable of natural beautifiers, especially in the case of oily skin, blackheads, pimples or rough skin. Washing the face with diluted lemon juice will bring surprising benefits. For the neck and shoulders one can apply the lemon juice undiluted.

A good, economical household plan is to save the lemon peelings, after making lemonade or using the juice, and to rub the face, neck and shoulders with the inside of the lemon peeling, thus using up the little remaining juice in this way. Where the hands are badly stained from cutting vegetables or from other causes, lemon juice is the most effective means of cleansing and bleaching them. Where the hands are sore and rough the lemon juice may smart temporarily, but it will leave the hands soft and comfortable. When using lemon juice full strength, it should either be sponged off with milk or rinsed off with water in a few minutes. For a face wash dilute it, using half a lemon to a pint of water.

Strawberry Lotion.—Strawberries were used by the ladies of ancient Rome to whiten the skin. Fresh, ripe strawberries should be mashed to a pulp and the juice strained through a cloth. Dilute with an equal part of water and add a pinch of borax. This tends to whiten the skin and make it clear.

Watermelon Rub.—Rubbing the face, neck and arms with the pulp of a watermelon has an excellent effect in clearing the skin.

Tomato Bleach.—To make a yellow skin more clear, take a slice of a ripe tomato, rub well upon hands, neck or shoulders for five minutes and then rinse off with water mixed with borax, taking a teaspoonful of borax to a quart of water.

Cucumber Lotion.—Good results may sometimes be secured with oily skins by rubbing with sliced cucumbers. The cucumber pulp also may be pounded in a bag, the juice strained through and applied to the skin two or three times a day.

Barley, Honey and Egg.—Where the skin is coarse and the pores enlarged, a satisfactory remedy will be found in a mixture of ground barley, three ounces; honey, one ounce; and the white of an egg, one ounce. This should be spread upon the face at night, using a cheesecloth protector or

mask. It should be washed off in the morning with lukewarm water followed by cold water.

Oatmeal Water.—A little raw oatmeal stirred into cold water for washing the face is excellent for making the skin soft and smooth.

Superflous Hair.—The electric needle is the only absolutely satisfactory treatment for the removal of superflous hair. Avoid chemical depilatories; they injure the skin and sometimes cause increased growth of hair. Take no chances. The most satisfactory home treatment is to use small tweezers and pull out the superfluous hairs one by one. They may grow again a few times but with repeated extractions they will become discouraged and you will not be bothered with them further.

Moles and Warts.—Moles and warts may be destroyed by the electric neeedle, but the most simple treatment is the use of diluted nitric acid. Apply this with a match stick. and simply touch the mole or wart with it once each day.

Birth-Marks.—It is best not to experiment with birth-marks, inasmuch as nothing can be done for them in most cases.

CARE OF THE HAIR.

Health and Beautiul Hair.—The woman who desires to improve the condition of her hair should learn, first of all, that vigorous health and good blood are more important than local treatment. In poor health, the hair either falls out or becomes dull and dead in appearance. In vigorous health, the hair takes on the appearance of life and health, with a beautiful lustre. Therefore even the hair is a feature of beauty that reflects the general condition of the body.

Care of the Hair.—The most important and most valuable treatment for the hair is plenty of brushing. Most women try to do their hair up as quickly as possible and have it over with. In the time of our grandmothers, women would spend a half hour or more in simply brushing the hair. Thorough treatment of this kind made it healthy and luxurious. Brushing stimulates the roots of the hair and promotes active circulation in the scalp. A woman should spend at least twenty to thirty minutes each day in brushing the hair if she wishes to improve it.

Next to brushing, massage of the scalp is of great value in directly stimulating the circulation in the tissues about the roots of the hair. In many cases the scalp tends to become tightly adhered to the skull, and in order to maintain good circulation the connective tissues should be

loosened. In massaging the scalp, the finger tips should be placed firmly upon it at various successive points, so that they will not slip, and a rotary, or circular movement should be used so as to give the scalp as much elasticity and movement as possible.

Gentle pulling of the hair, supplementing the brushing, is likewise of great value in strengthening the roots of the hair. One should not pull too hard, but just enough to bring about a feeling of life in the roots of the hair. This should be done each night before going to bed and before doing up the hair in the morning.

Washing the Hair.—One great mistake is often made in the use of strong soaps on the hair. In most cases a plain castile soap should be used, lathering and rinsing very thoroughly.

The most satisfactory method of washing the hair in most cases is the use of an egg shampoo. Beat up a fresh egg with a tablespoonful of water and rub it thoroughly into the hair and scalp or five minutes or more with the finger tips. After thoroughly treating in this manner, it may be rinsed off with lukewarm water. It will be best to use several changes of water to accomplish this effectively.

The frequency of washing will depend upon the character of the hair. Where the hair is dull and dry, one should not wash it often and should never use anything but the egg shampoo. Where the hair is very oily or where there is dandruff, frequent washing will be required, perhaps once each week or every ten days.

Dandruff.—Dandruff is the result of excessive activity of the oil glands and should be combatted with vigorous treatment in the way of scalp massage, brushing and pulling of the hair in order to improve the local circulation. One suffering from dandruff should never use very hot water on the hair but can advantageously use plenty of cold water. If the case is unusually stubborn, it will be best to use tincture of green soap instead of the castile soap. This should be thoroughly rubbed into the scalp with a soft brush, in order to remove all the dandruff, and the subsequent rinsing of the hair with lukewarm water should be exceedingly thorough. It should be said that a certain amount of fine dandruff is only natural and should not occasion any concern. It is only when dandruff is excessive and the hair unusually oily that one should try to check it.

Falling Hair.—Falling hair is practically always associated with dandruff, although disease of one kind or another may be responsible. Improved general health is nearly always reflected in a lessening of the loss

of hair. The general stimulating treatment of the scalp through brushing and massage is of the greatest value. The hair and scalp should be exposed to the sunshine, if possible, for a certain time each day. Where there is falling of the hair without much dandruff, a good, stimulating treatment would be the alternate use of hot and cold water without soap two or three times each week.

Brittle Hair.—Brittleness and splitting of the hair is simply the result of a dried condition and is due either to the lack of activity of the oil glands or to the use of to much or too strong soap. In such cases a little olive oil may be applied to the scalp with the finger tips. Be sure to apply it on the scalp rather than to rub it on the hair. Singeing is of no value, although it was a supposed remedy of great popularity many years ago.

Cutting the Hair.—The value of cutting the hair as a means of stimulating the growth has been greatly over-estimated. Repeated cutting robs the hair of its vitality. Many authorities now claim that the only reason why men are more subject to baldness than women is because of the hair-cutting habit among them. A woman's hair should never be cut short after the age of puberty or maturity, for in many cases it is impossible ever again to regain the full growth.

Gray Hair.—When the hair turns gray, it does not mean that the health of the hair is in any way impaired, but simply that the tiny color producing glands have gone out of business. Gray hair previous to middle age can often be restored to its natural coloring by improved health and hair culture, and especially when it is the result of nervousness or poor health. In more advanced years, however, there is nothing that can restore color after the hair turns gray or white.

CARE OF THE TEETH.

Diet in Relation to the Teeth.—Good teeth really depend on good health and satisfactory nutrition, although good health in turn depends somewhat on good teeth. Thorough mastication of food is essential to good digestion and good health, and mastication is impossible without sound teeth.

Too much attention cannot be given to cleanliness of the teeth and mouth as a means of avoiding conditions which lead to the decay and loss of the teeth. At the same time, however, there is one factor in maintaining sound and healthy teeth that is commonly overlooked, and that is the character of the food. The preservation of the teeth depends on good

nourishment just as any other part of the body depends upon securing suitable building material from the food consumed. If the diet is lacking in the elements required for building teeth and bone, the decay and loss of the teeth is almost inevitable.

All foods rich in lime and organic mineral salts are of great value. For this reason whole wheat bread is greatly superior to white bread, and in the case of children especially whole wheat or graham bread, shredded wheat and all whole grain products will tend to build strong, healthy teeth. Oatmeal is a food of special value for this purpose. Milk and eggs are both rich in lime and are valuable to supply the material for building teeth and bones. Vegetables, eaten with the water in which they are cooked, are valuable, and fruits are particularly to be recommended. Fruits are not only advantageous from the standpoint of their nourishing elements, but because of their cleansing effect upon the teeth and mouth, especially when eaten without sugar. If one will eat natural foods, calling for exercise of the teeth, and supplying all the elements provided by nature, one will have healthy teeth such as he cannot possibly enjoy by eating white flour, polished rice, white sugar, corn syrup, and other foods which have been refined by manufacturers until they are of very limited value from the nutritive standpoint.

At the same time mouth hygiene and the care of the teeth are none the less important. Every child should be trained in this way and especially women should take care of their teeth because of the special tendency of childbearing to bring about the loss of the teeth where the diet is not entirely satisfactory.

Brushing the Teeth.—The teeth should be brushed at least once each day, but it is better to brush them after each meal. This would be convenient for most women living at home, although it would not be for many women in business. In any case it is a simple matter to brush the teeth on rising and retiring.

The common practice is to brush the teeth with a lateral movement. This, however, is insufficient inasmuch as the brush does not in that way reach the crevices between the teeth. They should be brushed with a short, vertical movement, so that the bristles may reach the spaces between the teeth as perfectly as possible. It is these crevices that really most need the cleansing, for it is in these that the decay commences.

The use of dental floss is a much neglected practice. If anything, dental floss is even more important than the tooth-brush, for it is only by the use of something of this kind that one can completely remove matter

that has lodged directly between the teeth. If you have not a good dental floss, a little piece of white silk thread will answer the purpose very satisfactorily. It is well, first, to use the dental floss thoroughly in all the spaces between the teeth and afterwards to complete the cleansing work by means of thorough brushing.

The standard tooth powders on the market at the present day are for the most part satisfactory. It may be said, however, that ordinary table salt is particularly to be recommended for the purpose. The salt, likewise, has a healthy effect upon the gums, helping to harden and give them tone. In fact, salt water may always be used advantageously as a mouthwash, rinsing with plain water afterwards. There is hardly anything better. It leaves one with a clean, wholesome taste in the mouth.

The stem of the althea blossom is to be recommended for the whitening of the teeth. Take the stem, crush the end of it, and rub the teeth vigorously with the crushed and juicy part, just as you would use a brush.

A good mouthwash is bicarbonate of soda. Dissolve a half teaspoonful in a cup of water. It is a good throat gargle also and is especially recommended for singers.

To remove tartar from the teeth, there is nothing so good as powdered pumice-stone. This can be rubbed upon the teeth with a piece of orange stick, the same as used by manicurists, until they are thoroughly cleaned and then the teeth brushed thoroughly and the pumice-stone rinsed well out of the mouth.

Fruit Juices for Cleansing the Teeth.—Many savage tribes have wonderful teeth in spite of the fact that they never clean them and do not know what a tooth brush is. It is largely due to their plentiful use of fruit, the juices having a valuable cleansing effect. In recent years, some famous dental authorities have advocated cleaning the teeth with fruit juices or food acids, such as dilute cider vinegar, instead with the usual alkaline tooth powders. It is claimed that fruit acids promote the increased flow of saliva and in this way bring about a greater alkaline condition of the mouth within a few minutes, inasmuch as the saliva is naturally alkaline. Furthermore, fruit is somewhat antiseptic and is always healthful.

STRONG BEAUTIFUL EYES.

There is no other feature that plays so prominent a part in making one attractive as the eyes. The eye is the window of the soul. It domi-

nates the face just as the face itself dominates the body. The eye is the most expressive feature just as it is the most important organ of sense, though one should apreciate the fact that the beauty of the eye is, to a large extent, a question of the condition of the tissues and structures surrounding it. In other words, the eye should be appropriately "framed." As a matter of fact, the expression of the eye is determined not by the eye itself, but by the eyelids, eyebrows, and the muscles which control these surrounding parts. When these muscles are weakened or fatigued, there is a drooping and tired aspect. When the muscles of these parts are contracted through pain, the eye wears the expression of agony or distress. When these parts are all well nourished, strong and healthy, the eye looks clear and strong. In other words, the eyes are a good barometer of the general health. They sparkle when one is full of vitality.

However, the eyeball itself has something to do with the appearance of the eye. The socalled "whites" of the eye, when in perfect health, are a light, clear blue in all fair skinned persons. This fact has a great deal to do with the beauty of the eye from the standpoint of color. When the whites of the eyes are muddy, or when they are congested and bloodshot, they naturally lose their attractiveness. In this respect also the eyes reflect the general health.

Much of the eye trouble of civilized races is due entirely to eye strain, and, in large part, to the use of artificial light at night. Those having a tendency to weak eyes should go to bed early and avoid artificial light as much as possible; they should especially avoid sitting in such a way that the light shines into their faces. Sewing should particularly be avoided in the evening, though sewing and reading are not to be encouraged under any conditions by those whose eyes are weak. It may be said, however, that with the building up of the general health and improving the condition of the blood, the eyes always get stronger and partake of the general improvement. A great many people have been able to discard glasses simply through taking up systematized physical culture.

Headaches are very commonly due to eye strain. In all cases of persistent headaches or frequently recurring headaches, the eyes should be investigated. It is well in such cases to consult a competent oculist. In every case where there seems to be the least tendency to eye trouble, nervousness or headache, the eyes should be examined. Even where the sight seems perfect, glasses may be needed to relieve eye strain until the eyes are stronger.

Salt Water Eye Baths.—Are of great value in toning up these organs.

Water as a cosmetic. 1. Plenty of cold water tones up the skin and gives it that "fresh" appearance. 2. Do not wash the face with hot water, but use cool or luke-warm water, with a little castile soap. Use the washcloth gently. 3. Cold wet compresses, using washcloth or small towel, will help to clear the complexion and improve its color. 4. A small piece of ice rubbed over the face will close the pores, improve the circulation, and give "life" to the face. It is the most stimulating of all means for this purpose. 5. If the face is tender the ice may be wrapped and held in a small cloth when applying it.

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1. Moles may be touched with a weak solution of nitric acid, applied with a match-stick. 2. Removing superfluous hairs with small tweezers, the best home treatment. 3. Using a blackhead remover. Never squeeze them with the fingers. 4. Always apply a good antiseptic to the face after treating blackheads or pimples. 5. Stroking under the eyes, sideways, not downwards, for puffiness or sagging under the eyes. 6. In drying the face do not rub roughly, but pat the face with the towel, gently, until dry.

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1. The soft flesh brush is the best of all means for making the skin smooth and soft, and for preventing pimples on the shoulders, chest and back. 2. Soft linen cloths, dipped in white of egg, may be applied to remove the lines or wrinkles at the sides of the mouth and upper lip. 3. The growth of the eyelashes is stimulated by gently pulling them. 4. The flesh brush is of value for giving color to the face, and improving the texture of the skin. 5. Massage is of special value for the body, and may be self-applied with advantage.

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1. Massage for the face should consist largely of gentle pressure, applied with a small circular movement, but no pulling and stretching of the tissues. 2. In smoothing out wrinkles, rub in the same direction, never across them. 3. Massage for a double chin is of great value, stretching the head up when applying it. Massage for the bust is of much value, and should be applied with a circular movement, never with downward strokes.

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1. In brushing the teeth, use a vertical rather than a lateral action, so as to reach the spaces between the teeth. 2. The regular use of dental floss, thus cleaning the spaces between the teeth, is if anything even more important than the use of a toothbrush. 3. A bandage to be worn at night to correct outstanding ears. 4. A device to prevent mouth-breathing during sleep. A bandage applied in this way will hold the mouth shut so that one will breathe through the nose properly.

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1. Thorough and prolonged brushing of the hair night and morning will insure its luxuriant growth. 2. Before doing up the hair, always give it a gentle pulling, taking only a part of it at a time, and thus stimulating the roots. 3. Once each day, if possible, spend some time massaging the scalp with the finger tips, thus improving the circulation and giving life to the roots of the hair. 4. When convenient, massage of the scalp may be advantageously administered by another, but it is quite as satisfactory when self-applied.

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They will sometimes cure a headache. They are more stimulating when used with cool or moderatly cold salt water, but they may be used warm. One can use a small eye cup for this purpose or immerse the face in a basin of salt water, opening the eyes under water and rolling them around so as to give the eye ball a good salt bath. Repeat this several times.

Where there is any inflammation of the eyes, bathing with boric acid solution is even better than salt water. For this purpose an eye cup should be used, using a fresh solution for each eye. If the eyes are strained and sensitive, however, they should be protected from the light, perhaps by a bandage, and in such cases it is always well to consult a specialist. Sometimes complete darkness for a day or two will so rest the eyes as to restore their strength.

Massage and Exercise for the eyes themselves help greatly in strengthening them and giving them the bright, clear appearance that makes for beauty. Exercises for the eyes consists simply in moving and stretching them as far as you can upward and downward several times, far over to each side several times and then around in a circle, reversing the circular movement after a few times. Follow this by squeezing the eyelids tightly shut and then opening them as wide as you can stretch them, shutting again, opening, and continuing this a number of times. This will strengthen the adjacent muscles and increase the circulation in the eye.

Massage of the eyes may be administered with the heel of the hand, pressing gently and using a circular movement. Young children instinctively massage the eyes after crying with the backs of their little hands, but the base of the thumb or heel of the hand will be found more satisfactory as a rule. There is no question of the stimulating effect of such treatment.

Remember, however, that one's entire state of mind and also the condition of health are accurately reflected by the eyes, and all health building measures are of importance in beautifying these remarkable organs.

The eyelashes are important in their influence upon the beauty and appearance of the eye. They may be improved by the practice of gentle pulling, thus stimulating their growth and giving them strength. The same is true of the eye-brows, though rubbing olive oil or vaseline on the latter will also promote their growth.

Care of the Ears.—Not much attention is ordinarily required in the care of the ears apart from the matter of cleanliness. One mistake fre-

quently made, however, is the attempted cleaning of the ears with hairpins and other hard objects with which to remove supposed accumulations of wax. If the ears are washed thoroughly with an ordinary wash cloth, one need not be concerned about wax. The presence of a certain amount of this is natural and has a protective purpose. The finger nails especially should be kept out of the ears, inasmuch as scratches by the nails may give rise to serious inflammation, with possibly tragic consequences. The only thing that should ever be inserted into the ear is a little twisted wad of clean absorbent cotton, such as mothers commonly use in cleaning a young baby's nose. Nothing harder than this, however, should ever be inserted in the ear except by a physician.

Projecting or outstanding ears cannot in all cases be modified, although something may be done to improve them by wearing a bandage passing from under the chin over the ears and fastened at the top of the head, thus pressing the ears flat against the side of the head. Do not expect results in a week. This bandage must be worn over night for many months to get results, and the treatment will naturally be more effective in children than in the case of adults.

CARE OF THE HANDS.

A great deal may sometimes be learned of one's character through scrutiny of the hands. The hand is a wonderfully perfected mechanism and it is a member of the body well worth taking good care of.

Cleanliness is a matter of first importance in well kept hands. This does not mean, however, that soap should be used excessively, inasmuch as pure lemon juice is not only a more effective means of cleansing the hands, but it is particularly valuable for softening the skin. Furthermore, lemon juice will remove stains from the hands probably better than anything else in the world. At the same time, where the hands are soiled with grease, the use of soap will be necessary, always rinsing well afterwards with cold water.

Chapped Hands.—There is good reason to believe that chapped hands are largely the result of dirt which has worked into the skin and thus produced an irritation. Therefore a thorough cleansing should be the first step in overcoming a chapped condition of the hands. Thorough washing with a mixture of warm water, castile soap and corn meal is very valuable, afterwards rubbing in a little olive oil, vaseline or cocoa butter.

In order to protect the hands when any dirty work is to be performed,

it is a good plan to rub the hands well with olive oil. This will prevent dirt from working its way into the skin. Or one may wear rubber gloves or an old pair of kid gloves.

One of the most effective treatments for chapped hands is a half and half mixture of glycerin and rose water with a benzoin added. This should be rubbed into the hands well after washing with warm water and before going to bed. Where there are deep cracks as the result of chapping, hot melted tallow or shoemaker's wax may be dropped upon the cracks, where it will immediately harden and protect the sensitive tissues until they have had a chance to heal.

Oatmeal Water is splendid for washing the hands. Oatmeal boiled in water may be strained, using the liquid as a wash.

A good preparation for whitening the hands is a mixture of equal parts of cocoa butter, refined wax and oil of sweet almonds, first heating, then stirring until cool and applying to the hands before retiring. Bran mixed with buttermilk to make a thick paste may be rubbed upon the hands at night, after which put on loose gloves and let them remain until morning. Another satisfactory preparation for whitening the hands is a mixture of equal parts of glycerin, rose water and lemon juice. First wash the hands with oatmeal or almond meal water and then apply this mixture.

Red Hands.—Redness of the hands is usually an indication of poor circulation. Tight gloves, tight sleeves or even tight lacing at the waist, by preventing the free circulation of the blood, may be the cause of red hands. The blood does not return freely from the extremities. Holding the hands upward will relieve this condition and also relieve the swollen condition of the veins. For permanent results, exercise, massage and keeping the feet warm will be effective. Washing in cold water is the best temporary remedy.

For perspiring hands, there is nothing better than washing in a little cold water in which a lump of soda is dissolved. Dusting with a little starch will help. Lemon juice will also be valuable in such cases.

Care of the Nails.—If the nails are not abused in any way, they do not need a great deal of attention, aside from proper trimming. For this purpose a file should always be used rather than scissors. Cutting thickens the nails. In filing, the file should always be held between the nail and the flesh rather than at right angles. The deposit of dirt beneath the nails should be removed only with an orange stick. Never use a sharp instrument for this purpose.

The greatest mistake in connection with the nails is the habit of chewing or biting them off. It is largely a nervous habit. The best cure for this is careful manicuring, so that there will be no temptation to bite off jagged ends. Any one who takes pride in her nails and cares for them properly, will find it almost impossible to bite them.

It is advisable that every woman should secure a little manicure outfit and use it regularly. A chamois-skin polisher will be effective even without the polishing powder ordinarily used, though of course this will help.

Brittle nails are the result of defective diet.

Exercise for the Hands.—Exercise for the hands is necessary to keep them in good condition. Hands that are too soft or too much unused are never attractive. If one has no regular employment requiring active use of the hands, piano playing is to be recommended, together with vigorous massage. Shaking hands with yourself and squeezing or massaging the hands and fingers vigorously in this way will promote an active circulaiton that will not only build up the muscles, but strengthen the bones, tendons, ligaments and other structures in the hands.

Care of the Feet.—The most important factors in the care of the feet are cleanliness and proper footgear. The question of footgear has already been referred to. Corns and bunions are entirely the result of imperfect footgear and can only be permanently corrected by wearing shoes that fit.

Tender feet should be treated with a cold salt water bath each morning. After each washing with warm water and soap they should also be treated with a cold salt water bath, after this massaging and rubbing them vigorously with a little olive oil. This treatment will accomplish wonders.

For perspiring feet, frequent washing is necessary and the salt water suggested will be valuable. The foot may also be dusted with a half and half mixture of starch and salicylic acid.

For flat feet, see "Corrective Exercises" under "Physical Culture and Body Building."

BOOK XVII

Treats of Physical Culture and Body Building. The book is divided into three parts, describing respectively exercises for men, women and children.

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A superb example of physical development. This shows a splendid combination exercise for neck and chest. Pull the head back in this manner while resisting the movement with the arms, and repeat until slightly tired. This exercise will insure good chest expansion.

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active exercise and a cold bath, by stimulating respiration, will also quickly bring a sense of refreshment.

CORRECTIVE EXERCISE.

Remedying Bodily Defects.—In two respects systematic exercise has a great advantage over play or athletics as a means of physical development. Active open air pastimes, while always recommended, do not necessarily mean a perfect development of all parts of the body. Exercise, however, properly designed and systematized, will bring about symmetrical development, for each part of the body will be employed in such a way that there are no weak parts. And in the second place, special exercises may be used for corrective purposes where there are bodily defects. Many athletes may be found who are well trained in some specialty, but are nevertheless one-sided in development.

Such conditons as flat chest, drooping or "round" shoulders, spinal curvature, a pouchy abdomen, head hanging or thrust forward, flat foot, "chicken breast," and other similar defects, may be either partially or entirely remedied by appropriate exercise.

To a large extent, however, ordinary development exercises of the best type are corrective in their influence. In other words, so far as the trunk of the body is concerned corrective and development exercises are to a large extent identical. The subject should be understood, however, so that intelligent selection may be made of those exercises which in each individual case are most suited to one's requirements. All exercises which strengthen the back, and especially stretching and bending movements, are corrective of spinal curvature. All exercises which bring the shoulders back and improve the carriage of the head have a corrective influence upon the chest. In both flat-chest and "chicken breast," chest expansion exercises and chest breathing exercises are advisable, though proper posture in such a case is most important of all. All exercises which tend to strengthen the stomach and abdominal muscles, and particularly those which also promote improved posture, will tend to overcome a pouchy or sagging condition of the abdomen. All neck exercises will strengthen that part and improve the carriage of the head. Flat-foot or weakness of the ankles may be corrected by systematic exercise and especially by the wearing of moccasins or sandals, going barefoot, and the practice of "toeing-in" when walking. Exercises for gripping with the toes, for placing the weight on the outside edge of the foot, for arching the foot and for

deep-knee-bending with the toes slightly turned in will be valuable in flat-foot and other foot troubles. The strengthening of any of these parts will naturally be corrective, but by selection of special exercises suited to each case wonderful results can be secured.

Influence of Correct Posture.—Where there is any occasion for the use of corrective exercise special study should be given to the question of bodily posture. This is always important, even where there is no physical defect or weakness. Correct posture really means a properly balanced and erect condition of the spine. Everything else depends upon this fundamental necessity. An erect spine naturally involves a normal position of the shoulders, chest and abdomen. The chest, under such conditions, is in an active position, well raised and expanded so as to give room for heart and lungs. The shoulders are fairly well back and the abdomen somewhat retracted. The extreme military position, with the abdomen far drawn in and the chest thrown far forward, is neither necessary nor desirable. It is essential, however, that a comfortably erect position be maintained. By holding the head fairly well back this position is easily assumed.

The Spinal Column in Correct Posture.—We have said that good posture is chiefly a question of an erect spine. The human spine is unique in the animal world because man is the only animal who naturally stands erect. This has required a certain variation in the evolution of the spine peculiar to the human race. Particularly this variation involves the natural curves in the spine, of which there are three, the more important for our present consideration being the lumbar curve, which is responsible for the conspicuous arching of the back at the waist line. It is true that these curves help to give resiliency, but fundamentally they are the direct result of our erect posture. This arching of the back, therefore, is an inevitable feature of an erect position. When you slump forward, with shoulders drooping and chest flat, the arch in the back tends to disappear. But when you draw yourself up to your full height, with chest elevated and expanded and head thrown back, the arch in the back becomes pronounced. When you hear reference made to a "straight back," the idea conveyed should be that of square shoulders and erect posture, inasmuch as the spine is never really straight in the strict sense when the body is properly carried.

Exercises for Correct Carriage.—Therefore if you see to it that the back is arched in this way you can depend upon having a correct carriage. As a means of securing this at any time there are three extremely simple

fluence directly. All other structures must be improved indirectly through the influence of exercise and other measures in the improvement of the blood and the promotion of the general health.

The first and most important effect of exercise is accelerated circulation. The breaking down of the cells brings about a demand for oxygen and new building material, and also the necessity for the removal of the carbonic acid and other waste products formed. Therefore, the heart is compelled to beat more rapidly, pumping the blood through the arteries and finally through the capillaries in such a way that the oxygen is supplied to every minute part and the waste materials are taken up by the blood-stream and carried to the channels of elimination. This means increased breathing, increased action of the kidneys and increased perspiration. Under conditions of physical stagnation the removal of wastes is sluggish and imperfect. The active and vigorous circulation induced by exercise, on the other hand, tends to cleanse all of the bodily structures. A sufficient amount of exercise, therefore, means a condition of internal cleanliness. Exercise for those who are strong enough to take it is the most valuable of all blood purifying measures.

Fatigue.—What we call fatigue is simply the result of an accumulation of the waste products resulting from metabolism. If not removed they will poison the body and make life impossible. When they have accumulated, even to a limited degree, these waste-poisons produce a stiffened and weakened conditon of the muscles in which the latter are incapable of normal action. The relief of this condition necessarily involves the removal of these fatigue-poisons. This is ordinarily accomplished during sleep and rest, although it is hastened by massage, hot water bathing and other measures that increase the circulation and hasten elimination.

These fatigue-poisons are produced not only by muscular effort but by brain work or the functioning of any other of the organs of the body. Under conditions of physical inactivity and sluggish functioning these wastes accumulate. Under such circumstances the first effect of exercise, by increasing the circulation, is to remove these poisons and thereby bring about a sense of refreshment. It is in this way that a moderate amount of active exercise is refreshing in its effects. It is possible, however, to carry the exercise to such a point that the muscular work itself involves such increased production of fatigue-poisons that the refreshing effect of the exercise is lost and one feels fatigued. For this reason exercise for constitutional purposes should not be carried too far.

Exercise for the Brain Worker.—It will be seen from what has just been said that mental work is productive of fatigue, or the accumulation of waste-poisons. That is why one feels exhausted at the end of a day of brain work. Exercise in such a case should be taken at five or six o'clock in the afternoon as a means of relief and refreshment. The increased circulation will enable one to sweep these wastes out of his system and to clear his brain. So long as your exercise is enjoyable it is productive of this result, but as soon as it becomes laborious and you lose the sense of pleasure you may understand that it is time to stop.

Classification of Exercise.—While practically all exercises have certain results in common, yet various forms of exercise are especially adapted for definite purposes. Certain types, for instances, are chiefly effective for purposes of *muscular development.* Other forms of exercise will be particularly valuable for *strengthening the internal organs.* We may term these *organic exercises. Corrective exercises* form a department of physical culture, the purpose of which is to overcome bodily defects and special weaknesses in various parts of the body. To a large extent it is the corrective influence of many systems of exercise that give them their greatest value. Finally, we may consider what may be termed *constitutional exercise,* the chief purpose of which is not to develop the muscular system, but to build vitality and improve the general health.

ORGANIC EXERCISE.

Strong Muscles or Strong Organs.—We have said that the first purpose of physical culture should be health and vitality rather than mere muscular strength. We need both, but the internal strength is the more important. There was a time when the thought of physical culture was associated chiefly with the biceps, the large, two-headed muscle of the upper arm. The physical training conceptions of that day had to do merely with strong arms and legs, and, to a certain extent, the ability to lift weights. Physical culture was something for the wrestler and boxer. But that day has gone by. Physical culture is now a means of health-building for the professional or business man, or anyone else, and is concerned chiefly with nervous energy and internal strength. The man of to-day wants strong organs most of all. He cares little about his biceps, except as it may be a means of promoting the general circulation and influencing the internal organs.

Strength of Back, Chest and Abdomen.—For the above reasons any

system of physical culture intended for the average man rather than for one specializing in athletics should consist chiefly of exercise for strengthening the trunk of the body and the internal vital organs. The exercises which we are illustrating are practically all of this type. An elaborate system of exercises for the arms and legs is of little value compared to a few simplified movements for strengthening the back, improving the chest and giving one firm abdominal walls. The exercises illustrated have been carefully selected for this purpose. It does not matter so much what exercise one takes so long as it accomplishes results. One may do as many exercises as he pleases, but such movements as have been illustrated are of the very greatest importance.

Exercises that affect the region of the back, sides, chest and stomach have a direct effect upon the internal organs, not only because the increased circulation in these muscles means an increased blood supply to the internal parts adjacent to them, but also because movements of the trunk of the body have the effect of compressing, stretching and otherwise moving the internal parts to a considerable extent, thus promoting functional activity. No one can be absolutely healthy without more or less activity of this kind, whether in the form of work or exercise. Exercises involving the region of the stomach and abdomen are of particular importance for the sake of firm abdominal walls and a general condition of strength and vigor throughout all these parts.

Breathing Exercises.—Voluntary deep breathing is a commendable form of organic exercise that directly affects the lungs and in that way influences the entire body. In civilization, and especially indoors, men and women neglect to breathe deeply. Inactivity and sedentary life are responsible for a degree of shallow breathing that is conducive to pale faces and lack of energy. One cannot live without oxygen and the more oxygen he inhales the better the condition of his blood. Deeper breathing also means the more perfect elimination of carbonic acid gas.

Now, ordinary muscular exercise is at the same time the most perfect form of deep breathing exercise. Under such conditions deep breathing is spontaneous. The lungs automatically adapt themselves to the oxygen requirements of the system. Muscular effort creates a demand for oxygen, or what one may call a condition of oxygen-hunger. Prolonged muscular activity, therefore, insures a perfect lung development. Under such conditons one does not need to think of special deep breathing exercises. Wild animals do not need to be taught deep breathing.

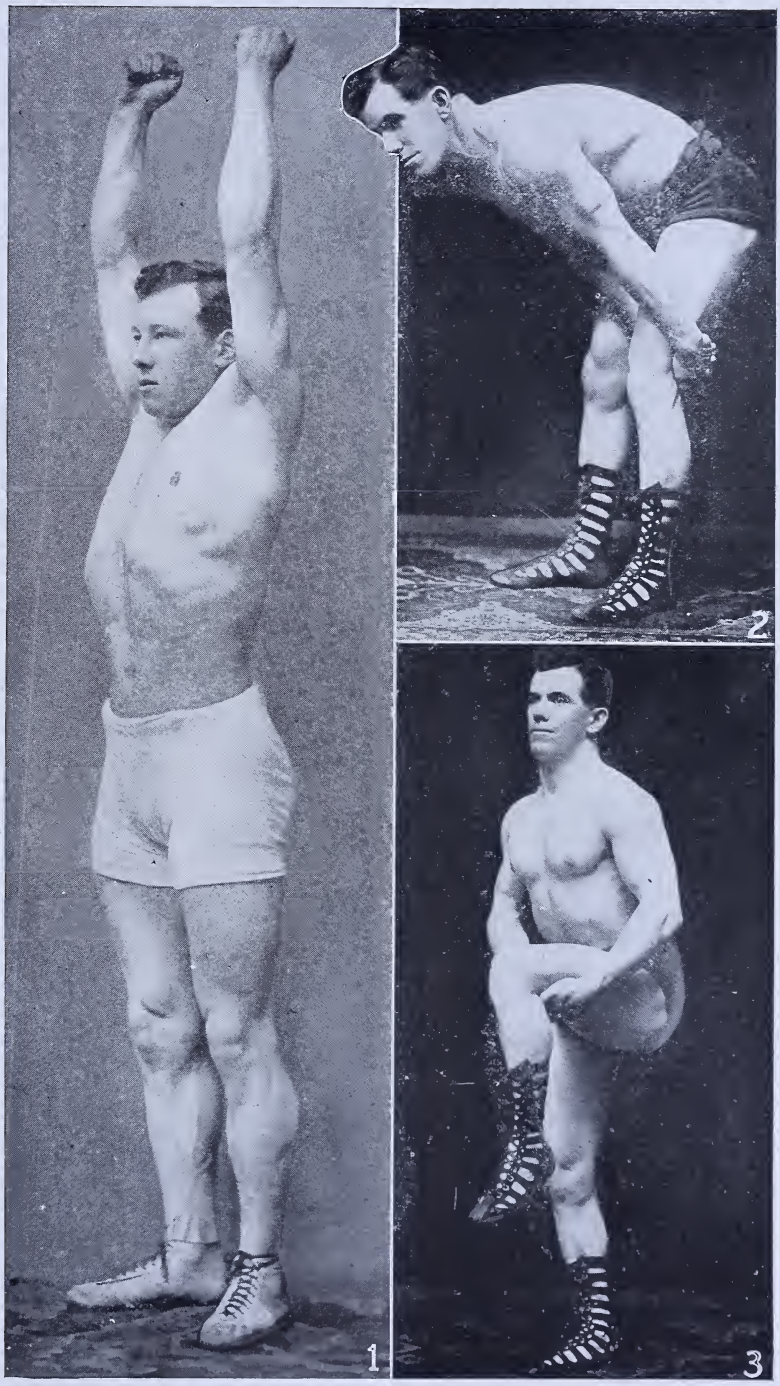
Diaphragmatic Breathing.—One whose occupation keeps him confined

for a large part of the day, however, should practice voluntary deep breathing frequently. This should take the form of diaphragmatic or so-called abdominal breathing. Chest breathing is unnatural except under conditions of extreme muscular exertion, as in running or wrestling. If one requires a tremendous amount of oxygen, chest breathing is instinctively resorted to temporarily to supply the demand. Under ordinary conditions, however, the natural method of breathing involves chiefly the expansion of the body at the waist line and in the region of the abdomen. This is because the diaphragm, during the process of inhaling the breath, presses downward in such a way as to cause the expansion of the body below it. The diaphragm is a large, flat muscular structure which forms a partition between the thoracic cavity and the abdominal cavity. It serves as a floor for the heart and lungs and as a ceiling for the stomach and other functional organs lying underneath. If you take an erect position and inhale a breath, drawing it down to the lower part of the lungs in the proper manner, you will find that the expansion is at and below the waist line, with perhaps a little expansion of the floating ribs. It is remarkable how much air can be inhaled and exhaled without expanding the upper chest. This is a form of deep breathing to be practiced as often as you can think of it. Inhale only through the nose. Exhalation may be either through the nose or mouth, but preferably through the nose.

While it was thought years ago that abdominal breathing was natural for men yet it was assumed somehow that chest breathing was the only natural method for women. The error of this assumption is now well understood. Chest breathing among women is found to be only the artificial result of corset wearing and tight lacing. If there is sufficient freedom at the waist line and below, women naturally breathe in the same manner as men.

The breath is never entirely exhaled. There is always a residue in the lungs and air passages. The fresh air inhaled is therefore only mixed with this residue of "dead air" in the lungs. In order that deep breathing may be as effective as possible, therefore, and the supply of oxygen as great as possible, it is well to exhale as much as one can before inhaling. In this way the new supply in the lungs is more nearly perfect.

Breathing exercises are valuable the first thing in the morning. If one feels "more tired than when he went to bed" it is often because of an accumulation of carbonic acid due to shallow breathing when asleep. Deep breathing exercise will overcome this condition quickly. A little



1. Stretching the arms vigorously high above the head, an exercise especially good for the spine. 2. First position in a vigorous exercise for the back. From this position, resisting with the leg, straighten up to the position shown in figure 3, pulling the leg upward. Repeat several times with each leg.

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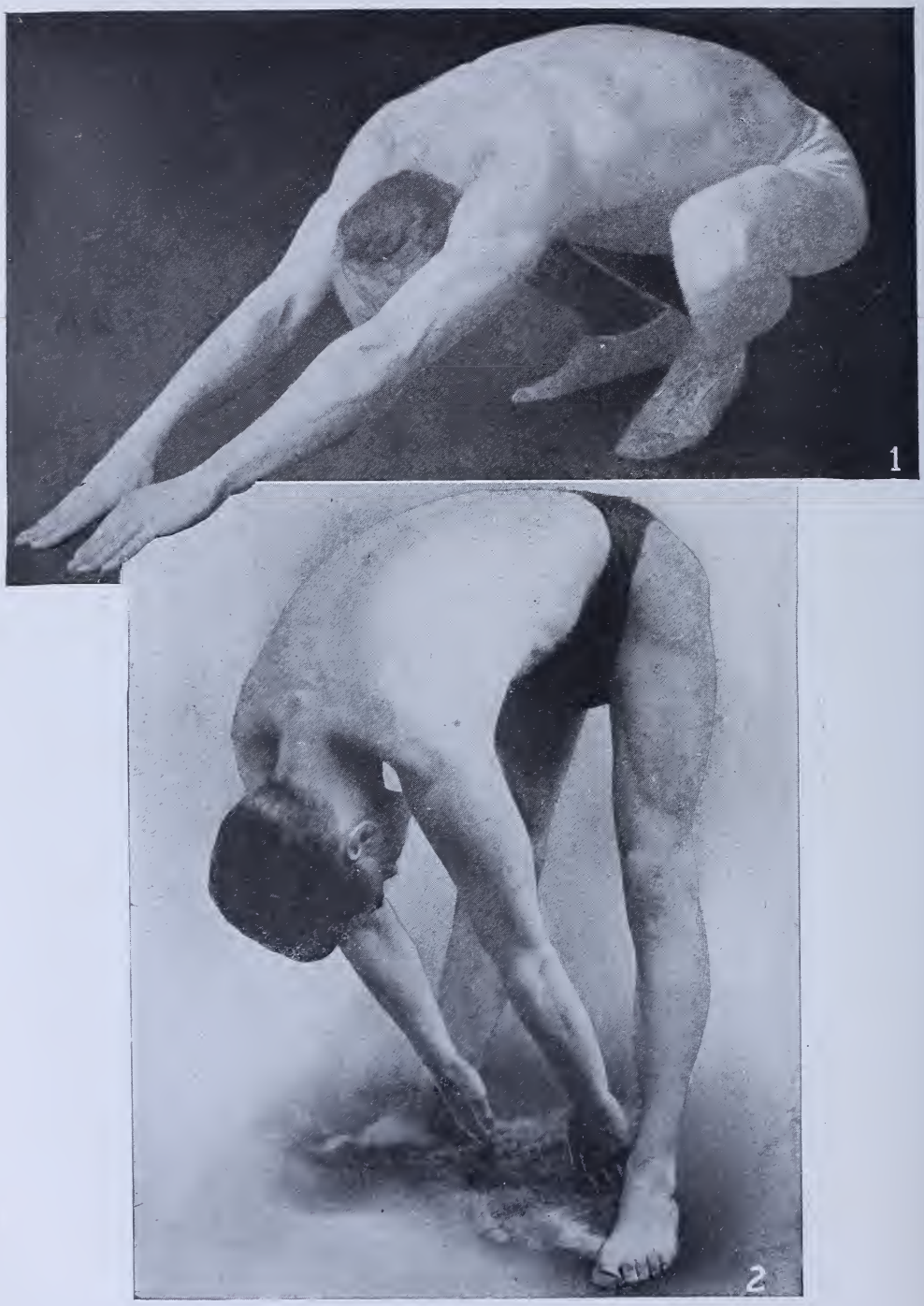

Two good back exercises. 1. Squat low down and stretch the arms vigorously far forward, touching the floor at a point as far as you can possibly reach. 2. First standing erect, with arms high above the head, and feet apart, swing down and touch the floor between the feet and at a point as far back as possible.

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exercises. The first of these is merely to stretch the arms high above the head. This will raise the chest, retract the abdomen and bring about a normal arching of the back. Maintain this position of the torso or trunk while bringing the hands down to the sides and you will find yourself standing correctly poised. Do the same thing sitting down. Another simple exercise is the familiar stretching and yawning movement in which the arms are doubled and the elbows brought up to a level of the head and then backward, with the head also drawn back. It elevates the chest and arches the back. Another splendid exercise is to clasp hands behind the back and then pull the shoulders backward and downward. Any one of these three movements may be put into practice a hundred times a day to help you maintain good bodily carriage. The last of the three may be practiced upon the street without attracting notice.

CONSTITUTIONAL EXERCISE.

Exercise for Functional Strength.—The relation of muscular exercise to the internal functions deserves special consideration. It is true that all development exercise is somewhat constitutional in its influence inasmuch as it affects the internal organs to some extent. It is also true that all constitutional exercises, such as walking and hill climbing, are somewhat muscle-building in character. Yet certain forms of exercise are useful chiefly for muscle building, while others are valuable mainly for vitality building. It may be said that any form of exercise which keeps the internal organs vigorously at work for a considerable period of time, even though it may not involve much muscular effort, may be regarded as constitutional in its effect because of having its chief influence upon the heart, lungs, kidneys, liver and internal functions generally.

In other words, exercises which build endurance are constitutional in their effect, as compared with exercises which merely build strength. Great strength in a muscle depends upon its capacity to overcome resistance. This power is developed by daily work in which great resistance is overcome, even though one may make only two or three such efforts each day. One may lift a certain weight only once or twice each day, and by gradually training the muscles to overcome a still greater resistance he will develop the power to lift a heavy weight. In this way the muscles may be enlarged but without involving the same amount of *continued activity* of the heart, lungs and internal organs that would be secured in long distance running or a ten mile walk.

Vitality Building.—Vitality building, therefore, really depends upon a sufficient amount of exercise as measured in time rather than in the severity or intense character of the work. For real constitutional benefit one should each day enjoy some exercise extending over a period of two or three hours at least, even if this consists only in walking. Golf is particularly valuable. Tennis is splendid. Hill climbing is a superb constitutional exercise. It keeps your circulation active and induces both deep breathing and free perspiration, both valuable blood-purifying measures. A system of ten-minute exercise is valuable so far as it goes, and is a thousand times better than no exercise at all; but for real constitutional results one should have some outdoor activity covering a period measured in hours rather than in minutes. One naturally cannot be too strenuous for a period of hours, and therefore walking, golf or some other moderate exercise, long continued, is best for vitality building purposes.

What Endurance Means.—Endurance, as distinguished from strength, means the capacity for continued exertion, or many repetitions of a muscular effort. One may have strength without endurance, but endurance is the more important. Endurance depends upon pure blood and a condition of internal cleanliness as determined by the ability to eliminate fatigue-poisons rapidly. It means functional strength and vitality. In building endurance, therefore, one builds vitality and internal strength. Those who are very strong will find it advantageous to practice cross-country running, wrestling, rowing and other vigorous exercises for the sake of endurance. Naturally, one should avoid over-exertion. To carry these strenuous pastimes too far would mean nervous exhaustion. But generally speaking, endurance means vitality. For those of less physical vigor it is sufficient to play golf, climb hills and take long walks. Horseback riding, cycling and other pastimes not too strenuous may be suggested for the same purpose.

We have previously referred to organic exercises as involving special movements for the trunk of the body which directly influence the internal organs. These will be decidedly constitutional in their effect, but not to the same extent as those which involve continued functional stimulation, such as will be found in prolonged activity.

DEVELOPMENT EXERCISES.

A Perfect Body.—While we have emphasized the importance of constitutional and organic exercise, yet a normal development is really neces-

An exercise for the muscles along the front of the body, from the thighs up to the arms. 1. First position, with hands and feet on floor, hips held as high as possible. Lower the hips to the position in figure 2, then rise to the first position, and repeat several times. Very good for the abdominal muscles.

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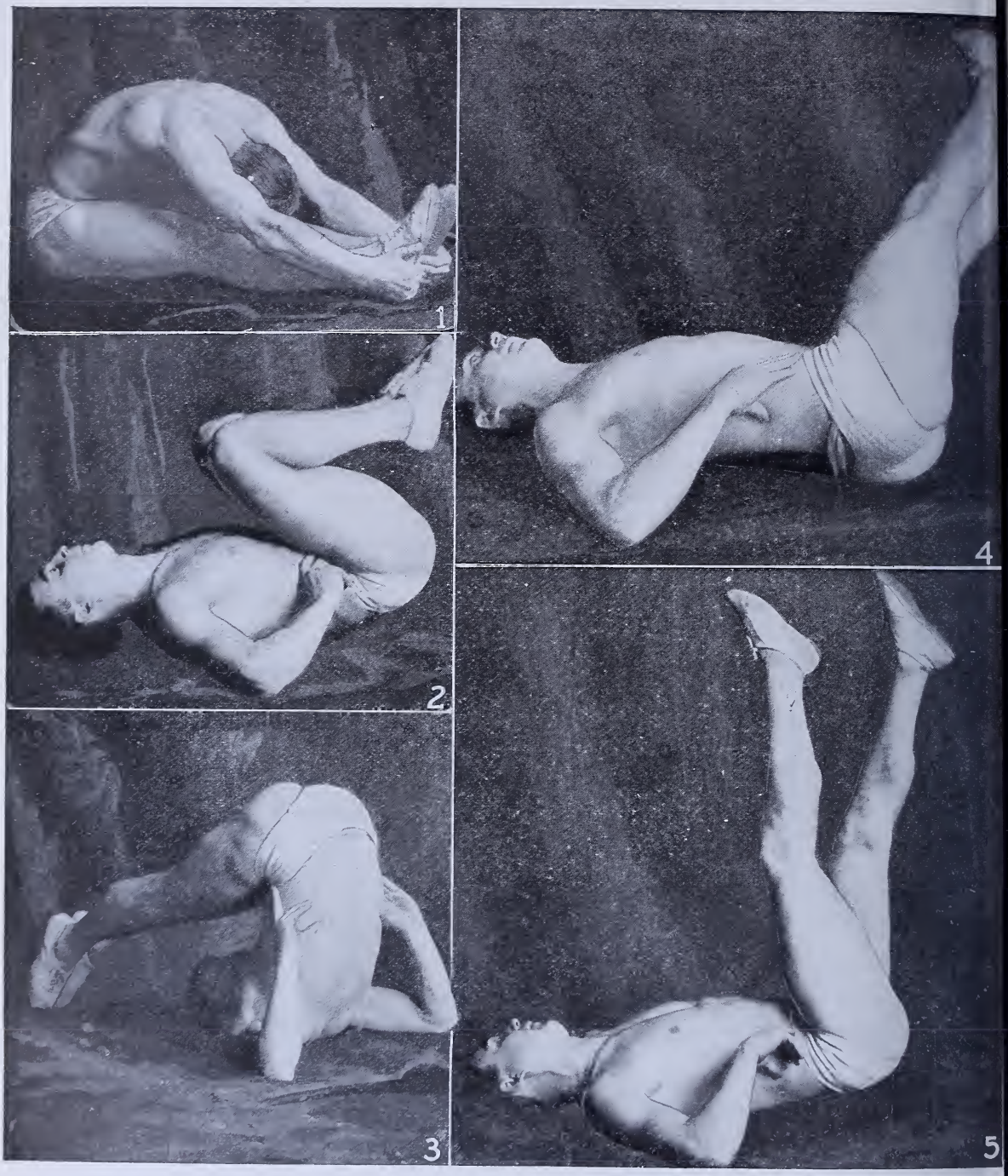

Some exercises for the stomach and abdomen, especially valuable in cases of constipation. 1. Reach far forward until you can take hold of the soles of the feet with the legs straight. Then pull the body still further down and forward. 2. Lying on the back, double the legs back against the abdomen as shown, then stretch them out on the floor. Repeat a number of times. 3. Lying flat on the back, raise the legs and bring them back over the head, touching the floor if possible, as shown. Repeat. 4. Lying on the back, raise the legs to the perpendicular, elbows braced on the floor, then lower the legs alternately to each side, about half way to the floor. 5. With legs held perpendicularly, swing them apart and then bring them together again. Also, in this position, practice a running movement of the legs.

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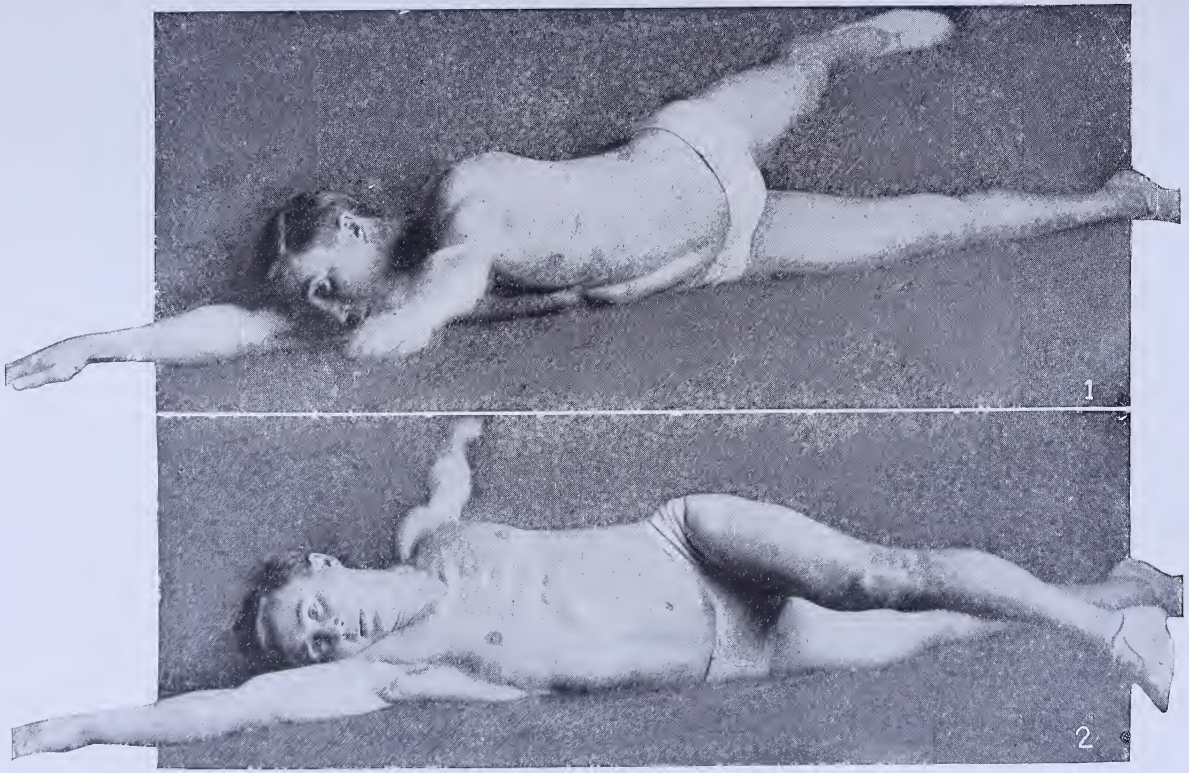

Twisting and stretching exercises for the trunk of the body. Lying on the side, first stretch the upper arm forward and the leg backward, and then stretch the arm backward and the leg forward, as illustrated. Repeat a number of times and then do the same lying on the other side.

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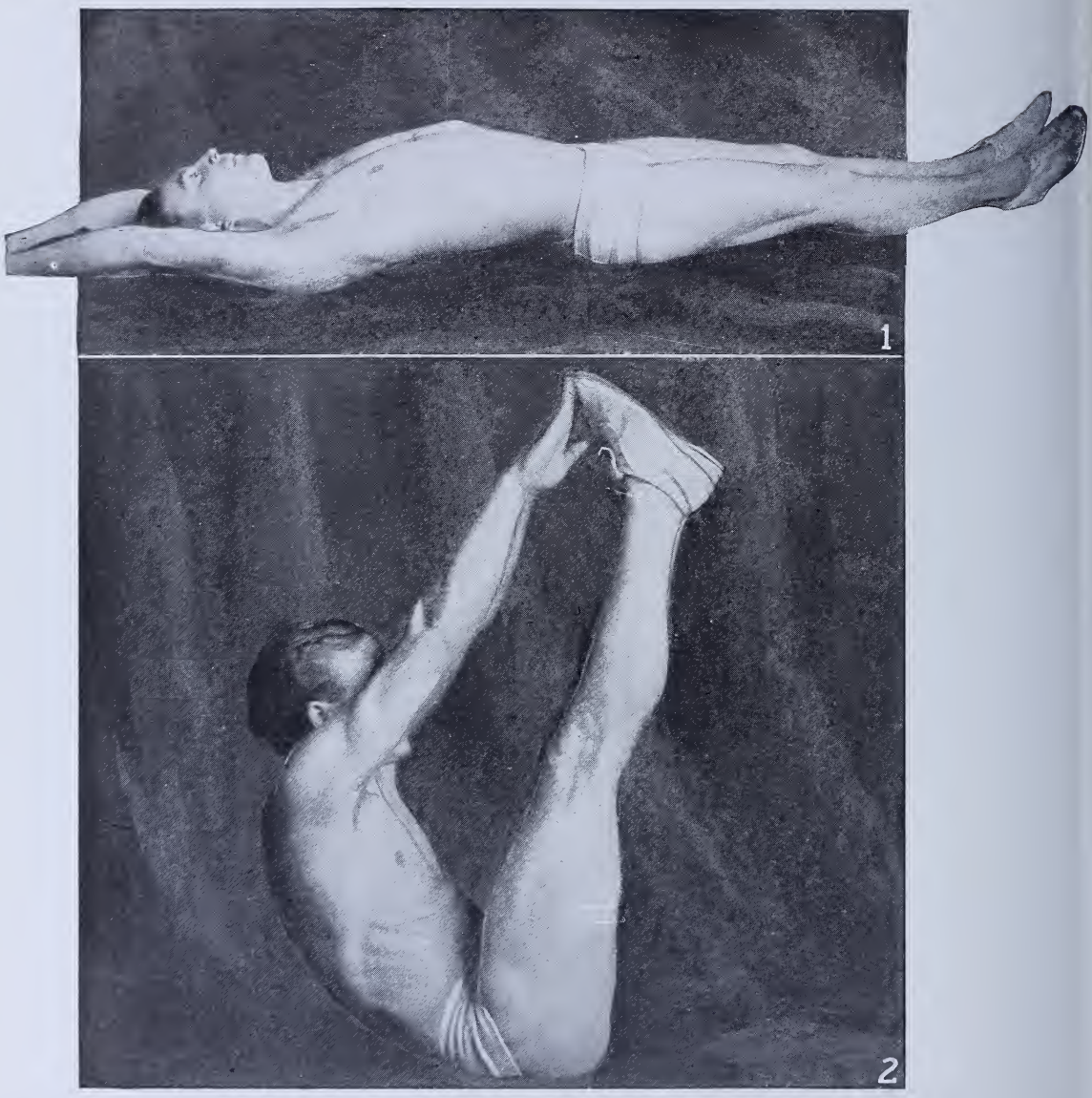

A strenuous exercise for the abdominal muscles. 1. First position, lying flat on the back with arms stretched back of the head. 2. Then, with a quick, energetic action, swing upper body and legs up at the same time until the fingers touch the toes. Repeat several times. You will have to do this with snap in order to accomplish it.

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sary in order properly to enjoy constitutional exercises and to influence the internal organs in the manner suggested. The more perfect the external muscular system, the more satisfactorily can one strengthen the internal organism.

There is no need to strive for Herculean strength, but a natural, normal development is essential. One should have a body of which he need not be ashamed. Symmetrical and harmonious outlines usually mean health as well as muscle. Remember also that any exercise which will strengthen the muscles will at the same time mean stronger bones, stronger ligaments and tendons, more healthy cartilages and a more firm, clean and healthy condition of every structure of the body. In overcoming resistance not only are the muscles strengthened but there is a certain amount of stress and strain on the tendons, the bones, the ligaments and all other parts involved. Even the arteries and veins are affected. The contraction of the muscles means pressure upon the blood vessels, thereby directly affecting the circulation. In the limbs, also, the movements tend to stretch and to shorten the arteries, according to the character of each movement. Accordingly, while advocating organic and constitutional exercise we do not belittle the value of muscular development.

Exercise versus Work.—It is often said that many men and women secure sufficient exercise in the course of their work. This involves a fundamental fallacy inasmuch as certain muscles are overworked, in most instances, while other muscles are unemployed and therefore undeveloped. Work usually means a one-sided development, sometimes with exhaustion of those muscles which are employed. In some cases, as in writers' cramp, telegraphers' cramp and other occupational neuroses, there is exhaustion of the nerve centres. Most "work" is of a character to stiffen and fatigue one, but without building any special degree of strength.

Exercise, therefore, is of just as much value to the manual worker as to anyone else. Some forms of work, such as chopping wood and pitching hay, are splendid exercise. Others, ploughing, for instance, are purely stiffening in their results. After ploughing all day some quick, light exercise will be refreshing and strengthening. One should always exercise those muscles not employed in his work.

Limitations of Athletics.—Athletic games are to be recommended for those physically suited to them. They will not, however, take the place of scientific physical training where one is in need of symmetrical development. Specializing in athletics frequently overworks certain muscles while neglecting others, just as is the case with many forms of work.

All-around athletics should be preferred. In all cases the young man before going into any athletic competition should prepare himself by systematic physical training to build up a normal development and strengthen any weak parts.

Light versus Heavy Exercise.—There is much controversy as to the relative value of light and heavy exercise. Both are valuable for special purposes. For one who is strong very light exercise is practically no exercise at all. He will require some form of exertion which gives resistance to his powerful muscles. Feats of great strength are perfectly natural where one is sufficiently strong so that there is no strain upon the vital organs in performing them. One who is weak and undeveloped, however, cannot attempt heavy exercise and should commence with light movements. As he gains in strength he may use exercises involving more resistance. It requires the expenditure of strength to build strength, and if he hopes to become very strong it will be necessary to use ever-increasing resistance. He should not, however, force himself too much. The theory that one can gain the strength of a Hercules by means of light exercise is without foundation. Pay no attention to the mail-order expert who tells you that you can have "muscles like mine" through five minutes of light calisthenic work, according to "his system." The facts are that the mail-order expert gained his amazing development from hours of weight lifting each day.

"Calisthenics" are valuable for all-around purposes, and in class work are suited to the needs of the average individual. In advanced physical culture, however, they are no longer sufficiently vigorous. Furthermore, the ordinary calisthenic "drill" contains a number of exercises for arms and legs which are of limited value as compared to such movements of the trunk of the body as are illustrated in this department of this work.

Weight Lifting.—If one wishes to become a professional "strong man" and has exceptional vitality, with a powerful frame to begin with, weight lifting is the one and only means of securing the greatest possible strength. It is not, however, advisable for the average man. There is no real objection to weight lifting for one who is already strong if he does not overdo it. One should be sure that he has a strong heart before using weights. It is possible by practicing speed exercises to maintain some pliability and speed in the muscles while handling weights, but it is nevertheless true that weight lifting has a tendency to promote stiffness of the muscles and a more or less muscle-bound condition.

Dumb-bells.—Dumb-bells of light weight were popular one or two

generations ago, but are not now much used. A dumb-bell drill is really a calisthenic drill in which these light weights are held in the hands for the purpose of giving some resistance and to make the movements more effective. If you practice calisthenics, dumb-bells are as useful for this purpose as ever, but they are inclined to make one slow even though they help to build strength. One can use a pair of flat-irons for the same purpose.

Tensing Exercise.—This is a form of exercise, much advocated and taught by mail-order experts, which consists simply of a method of hardening or "tensing" the muscles. One muscle or set of muscles is used to resist the contraction of the opposing muscle or set of muscles. For the arm, for instance, the flexor or biceps is used to resist the extensor or triceps muscles. High-sounding, meaningless terms, such as "physiological exercise" or "concentration exercise" are applied to this form of exercise by mail-order instructors. Tensing exercises, however, while somewhat effective, are not to be recommended because of their muscle-binding and stiffening tendencies. They call for an unnatural use of the muscles. The muscles were intended for purposes of movement and not to resist each other. Exercises involving bodily movement, or exercises against external resistance are infinitely superior to any of these freak "systems."

Stretching Exercise.—Stretching is a natural and spontaneous form of muscular action. When systematized stretching gives a fairly satisfactory method of exercise. It can never, however, take the place of active movement exercises. It cannot influence the heart or functional system to the same extent as active games and real muscular exertion. One may advantageously practice a few minutes of stretching for all parts of the body the first thing in the morning, but should not depend upon this limited form of exercise for all of his physical requirements.

Complete and Incomplete Movements.—It should be said, however, that a certain amount of stretching should form a part of all systematic exercise. All exercise movements should be as "complete" as possible, in order to stretch the muscles and other tissues. In our ordinary, everyday work our movements are usually limited in scope. We do not extend the arm fully or flex it fully. We do not bend as far to either side as we can nor stretch the arms as high above the head as we can. Special exercises, therefore, should extend the scope of our movements to their natural limit. In extending the arm in exercise it should be straightened absolutely. In bending at the elbow it should be flexed as far as it will go.

In bending the body we should bend as far as we can in each direction, and in raising the arms above the head we should raise them as high as we can stretch. This principle should be earnestly kept in mind, in order to keep the muscles supple and elastic, and in order to promote the circulation in the tendons, joints, ligaments and other structures apart from the muscles. The back, for instance, should be vigorously stretched in all bending exercises so as to influence the cartilages of the spine, thus keeping them elastic and healthy. It is, in part, the stretching of all sections of the body in systematized exercise that gives it its unusual value, and to neglect this feature is to fail to get the best results.

Gymnasium and Apparatus Work.—Practically all apparatus work in the gymnasium can be recommended as an effective form of exercise. Too much emphasis need not be placed upon apparatus work because thousands of people do not have the opportunity of visiting a gynasium regularly, and therefore should depend upon such exercises in the home as we have illustrated. But if a gymnasium is convenient the various forms of apparatus can be recommended not only for strengthening the body, and especially the arms, but because such apparatus helps to lend interest to the work of physical training. It is an excellent plan, especially where there is a family of children and a convenient yard for the purpose, to instal a little home-made apparatus. A horizontal bar, parallel bars, a vaulting horse and a trapeze or flying rings will all be useful in this way.

Owing to the elevated character of most forms of apparatus, such as the horizontal bar, parallel bars and rings, it may be said that exercise of this kind bears a certain relation to the natural life and activities of prehistoric man, and especially to those of our alleged ape-like ancestors, who lived in the trees. In other words, exercise of this type is strictly natural. Apparatus work is usually most effective for improving the shoulders, chest and arms, although to a certain extent valuable for the other parts of the body as well.

Rapidity of Exercise.—The question of the speed at which exercise should be carried on is frequently brought up. Should certain movements be performed rapidly or slowly? This depends upon the character of the exercise and upon the individual. As a general thing, movements should be fairly active in character and of a speed which one can best enjoy. Very great speed calls for more energy. Very slow movements are stiffening in their results, also fatiguing. As a general thing, exercises performed with a "swing" and a fair degree of speed are suggested. The quality of rhythm is also helpful.

Stimulating Exercise.—Fast movements have a stimulating effect upon the nervous system. They wake one up. They call for more energy than slow movements and they arouse the energies of the body more thoroughly. They are even mentally stimulating if not carried to the point of too much fatigue. Also they are refreshing. Slow movements are sedative in character. If one wishes to sleep soundly a few very slow movements, or walking very slowly, would make him feel tired and in a condition to sleep. A brisk walk, however, is mentally stimulating and all fast exercises are energizing. If engaged in any work of a monotonous, slow and stiffening character, then a couple of minutes of very fast exercise will be found refreshing. If stiffened from a slow walk of ten miles, a quick run will arouse an active circulation and make one feel fresh and energetic.

Relaxation and Contraction.—The best results in exercise of any kind will be secured from a policy of alternate contraction and relaxation of the muscles. In other words, the state of tension or contraction should not be prolonged, but momentary in character. There should be a moment of contraction and then a brief interval of relaxation, and then another moment of contraction. During the brief interval of relaxation a renewed blood supply is allowed to flow into the capillaries in the muscles, and in that way the exercise can be continued without discomfort and with the very best results. Prolonged stress or tension of the muscles interferes with the circulation by reason of the continued pressure on the blood vessels, and may result in a stiffened or cramped condition.

Occupational Exercise.—The character of the exercise best suited to various men and women will depend largely upon the nature of their occupation. One who does hard physical work will not need strenuous exercise but rather activity of a quick, light character. One whose occupation involves sitting down all day will naturally require some vigorous exertion. He needs real exercise, and if possessing much vitality and a strong frame he may benefit most by exercise of a decidedly strength-building character.

Exercise in Relation to Bodily Weight.—Undoubtedly those who are thin will require different methods of training from those who carry an excess of flesh. The thin man usually needs to conserve his vitality and must carefully avoid over-exertion. This is especially true if he is of a nervous temperament. What he needs is a small amount of exercise, but of a muscle-building character. Men are thin not simply through lack of fat but through lack of muscle. They need strength-building exercise

for enlarging the muscles, but only a small amount of it because they cannot spare too much energy. They should not, however, strain themselves. Also they need a certain amount of walking for constitutional purposes, but should not do any running.

On the other hand, the man who is over-weight usually has sufficiently large muscles already, in combination with his fat. Reference is made to the ordinary case of superfluous flesh, not those cases in which fat is a disease, for such cases need a doctor. Many stout men are powerful—that is to say, "awfully strong for a minute." They do not need strength-building exercise. What they need is fast, active exercise such as will build endurance. Their activity should be light, but continuous enough to burn up the fatty tissue. There should be no strain, but the exercise should be a matter of hours.

At the same time those who are over-weight must depend largely upon diet to secure a satisfactory reduction, especially eliminating the fat-forming foods, or in other words, the carbohydrates and fats. If they will eliminate bread from the diet together with cereals, rice, potatoes and other starchy food, and also sugar and other sweets, it is usually a simple matter to reduce weight.

Age and Exercise.—Age is usually the period of decreasing activity, but to a certain extent it is due to decreased activity. Age is not merely a matter of years; it is a bodily condition. Some men are old at thirty, others are still young in body and mind at seventy. To maintain youth is largely a matter of keeping physically active as well as observing other rules of health. Exercise is, therefore, just as important in advancing years as in youth.

Exercise for men above sixty years need not be so active or strenuous as that for young men, but it should be of a character to maintain suppleness, and especially it should be conducive to an erect bearing. What we have said about the importance of bodily posture applies especially in advancing years. It is found that healthy men in old age often possess remarkable endurance. Many records for long distance walking have been made by men between sixty-five and seventy-five years of age. Walking, golf, hill climbing and activities of a similar character are very highly to be commended. Appropriate exercise is one of the most effective means of avoiding the hardening of the arteries which is commonly associated with the declining years of life.

Exercise and the Bath.—A cold bath may be used in the morning as a tonic and as a means of improved circulation, but it should follow the

morning exercise. A cold bath is only valuable when one can enjoy it and recuperate promptly with warmth. If one feels chilly or nervous, or finds himself trembling afterwards it is weakening and harmful.

Success with cold bathing and the ability to recuperate depend largely upon being thoroughly warm before taking the bath. For this reason also it is better to take the bath in a warm room. One recuperates more readily. Exercise preceding the bath has the effect of thoroughly warming the body so that one may enjoy it and benefit from it. Never attempt a cold bath when already chilled, when the hands and feet are cold or when the skin takes the form of "goose flesh."

The shorter the bath the better. Simply stay in the cold water for a moment, whether a plunge or shower is used. If perspiring freely from exercise this is especially important. After the bath one should, in such case, use a warm sweater or bath-robe so that he may continue to perspire somewhat and cool off only gradually. One should not cool off too quickly or stay in a cold bath too long when perspiring. Under such conditions also it is a good plan to use a warm shower first and to wind up with a momentary cold shower. if all shower bath conveniences are available. Only one or two hot baths with soap a week are required for purposes of cleanliness, and such hot baths should always be followed with a cold shower or cold sponge.

Cold baths have a pronounced effect upon the circulation and are a tonic of great value for those with whom they agree. One of limited vitality, however, should be careful.

Air Baths and Sun Baths.—Air baths are of distinct value for their tonic effect on the nerves and for promoting the functions of the skin in general. Clothing is an artificial form of protection, tending to smother the skin and interfere with the elimination of waste matter through the pores. To take an air bath, simply remove the clothing in a comfortably warm room and allow the air to come in contact with the surface of the body. Air baths are conducive to good health and circulation, but it is always important that the hands and feet should be kept warm through good circulation.

Sun baths are stimulating and energizing, if properly taken. The sun is the source of all life and energy upon the earth, and the sun's rays directly stimulate the bodily metabolism. A sun bath and air bath may be combined, if convenient. Care should be taken by those of fair, light skins not to carry them too far, and especially in midsummer in the middle of the day. The vertical or nearly vertical rays of the sun have

a chemical effect which, although stimulating for a short time, become destructive to the nerve-protoplasm if continued too long in the case of those of blonde or unpigmented skins. Those of dark complexions can endure much more sunshine. The best time for a sun bath in summer is early or late in the day, though in winter one may take a sun bath at noon. There is no doubt that everyone requires a certain amount of sunshine the year around as a means of stimulating the formation of red blood cells and energizing the system generally. If care is taken to avoid the chemical action of the vertical rays, sun baths will be of great value in building vitality and strength.

Clothing and Sunshine.—Light colored clothing may generally be recommended as a means of permitting light to reach the skin. Gray and tan are excellent and serviceable colors for this reason. If engaged in farm work or otherwise too much exposed to the direct rays of the sun in the summer, some protection from the light may be desirable. Light colored fabrics are cool, but admit the light. Black or dark colored fabrics absorb the heat, but shut out the light. In a tropical climate or under the vertical rays of the sun, where protection from both light and heat are desired, one should wear black or dark underclothing to shut out the light, and white or light colored outside clothing to reflect the heat and keep cool. Hats should be white or light colored on top, with a dark lining. Arabs and others exposed to much sunshine wear white turbans and light colored clothing to keep cool.

Friction Rubs.—Supplementing air baths and sun baths, friction of the skin is of great value in promoting its functional activity. A coarse Turkish towel is excellent for this purpose, although soft brushes may be used. If the skin is tender and sensitive one may even use the palms of the hands. Five or ten minutes of this friction of the skin, briskly rubbing every part of the body, will more than repay one through the improved texture of the skin itself and the healthful influence of this treatment upon the body in general.

PHYSICAL CULTURE

PART II.

PHYSICAL DEVELOPMENT FOR WOMEN.

Strength and Womanhood.—It is a mistake to suppose that bodily strength is a possession to be cultivated exclusively by the male sex. The burdens naturally placed upon womanhood are such that strength and vitality are, if anything, even more desirable for women than for men.

Great muscular strength is not desired. But a certain degree of strength, concomitant with a natural and normal bodily development, is absolutely essential. The biological peculiarities of each sex are to be considered. Anthropological studies have shown that men are naturally better suited for exertions of a violent and strenuous character, but that in work or any form of activity requiring moderate exertion only, women on the average have better powers of endurance. It need not be said that women have more vitality, though there may be reason for thinking so, but it is undoubtedly true that they naturally have remarkable powers of endurance when at their best. They are not fitted muscularly for extremes of heavy lifting, nor for hunting and war, and so it is only natural that exercise of that character and games which simulate these activities should be limited to men. But within the natural limits of a woman's strength exercise and development are fully as important as in the case of men, and activities that promote grace and elasticity rather than strength are particularly commended.

Bodily Development.—Every woman desires a good carriage. Every woman desires a good figure. A normal bodily development, with its lines of strength and grace, indicates vitality and a conditon of physical wholesomeness. It is impossible to carry the body properly or to enjoy the possession of a good figure without a satisfactory muscular development. It is quite true that women naturally are supplied with slightly

more fatty tissue than men, but the real outlines of the body, nevertheless, are determined by the fundamental muscular structure. Without it, the whole body lacks character. Fat, without an underlying muscular formation, means shapelessness. The beauty, contour and shapely lines of healthy womanhood are determined almost entirely by the muscular development. The external layer of fat simply serves to fill in and make smooth the various parts.

Masculine or Feminine Outlines.—It has sometimes been suggested by uninformed and prejudiced writers that physical exercise tends to give a woman masculine outlines. This contention, however, is not borne out by the facts, inasmuch as the structure of a woman's body differs fundamentally from that of a man. No amount of exercise, no matter how far she may carry her physical training, can possibly give a woman the angular, lumpy and conspicuous muscular outlines of the over-trained male athlete. Humorous writers have sometimes referred to professional "strong men" as giving the appearance of having a large number of tennis balls concealed under the skin. This type of physical development, however, cannot possibly be secured by women, inasmuch as their muscles partake of a long, smooth character, productive of softer outlines.

Exercise for women, instead of making them masculine in appearance, only serves to accentuate their feminine qualities by reason of promoting better health. Their feminine attributes are more distinctly emphasized. The greater the degree of physical development in each sex the more perfectly will the secondary sex characteristics of each be made manifest. The more vitality that each possesses the more perfectly will they be differentiated in these respects.

The Right Kind of Exercise.—To a large extent all considerations applying to exercise in general, and especially to exercise for corrective purposes, will apply very forcibly in the case of women. It is not strong arms and legs that are most desired. On the contrary, physical training for women should be chiefly directed to building up strength of the trunk of the body. Even more than men women need strong backs, good chests and particularly a strong and firm condition of the abdominal region. To a large extent, therefore, the exercises we are illustrating are of a type to bring about increased strength in the trunk of the body. Aside from these special exercises all activities that involve grace and suppleness are particularly commendable.

Housework as a Form of Exercise.—Thousands of women are under the impression that they get plenty of exercise in the form of housework.

Unfortunately, they are mistaken. Housework is not exercise. If it were, nearly all women would be models of physical perfection. Housework requires a certain amount of activity and by special study certain forms of housework can be employed as exercise by doing it energetically and by modifying ordinary movements in such a way as to stretch the body and improve the posture. As usually performed, however, housework involves the use of only a limited number of muscles. Most of the activities in the home are of a nature to bend the back, cramp the chest, pull the shoulders forward and in other ways to operate against proper poise and the active use of the entire muscular system.

The houseworker probably needs exercise of the right kind even more than any one else. Housework has a fatiguing effect upon the body but does not refresh and strengthen like exercise. Houseworkers need special movements for raising and expanding the chest, pulling the shoulders back, straightening the back, bringing the head back and up, and in other ways for strengthening and improving the trunk of the body as a whole.

Poise and Carriage.—All that we have said in the section on "Physical Culture and Body Building" and about the importance of correct posture applies with special emphasis in the case of women, not only for the sake of health but for the sake of personal attractiveness and good appearance. The elusive quality which we often term "style" is not a question of clothing but a question of bearing. It is entirely a question of proper carriage. A woman may be gowned in the most expensive fabrics, but if she does not carry herself like a queen she has no "style." On the other hand, a woman with a well developed body, full of vitality and energy, may wear the most economical and simple kind of a dress, and yet by her grace of carriage and physical poise will give the suggestion of "style."

It is this quality that physical culture, and physical culture only, can develop in women. This quality may be the possession of every woman who will make the effort to perfect herself physically and to secure an upright carriage of the body. Posture alone may be insufficient, inasmuch as one might stand erect, but stiffly. Style and good carriage involve not only an erect position, but a certain freedom and grace of movement that can only be secured by proper muscular co-ordination, as developed through exercise. One must have control of her physical organism in such a way that every movement is free and easy. Active play during girlhood tends to give one this grace and muscular

control. Dancing helps to develop it, but physical culture is the most valuable of all measures for improving one in this particular respect.

Why Women Wear Corsets.—There is no question that the primary purpose of the corset was to supply in an artificial way the erect bearing which would naturally be the expression of vitality and a normal, vigorous bodily development. It may appear that many women at the present day wear the corset as a means of bodily support, and come to depend upon it for such support, but the corset when it was first worn was designed to make the figure more attractive. Even to-day many women continue to wear corsets because of the feeling that they would "look like a fright" without them. Considering their undeveloped physical condition it is quite true that they would be unattractive in their natural state. The corset tends to hold one erect, and the persistence with which corset wearing has been practiced throughout many centuries is largely the manifestation of the normal instinct of women to make themselves attractive and presentable. It is an attempt to supply by artificial means what should be supplied as a result of health and vigor. A prominent and protruding abdomen, largely as a result of improper carriage, and associated with drooping shoulders and a flat-chested condition, is an intolerable outrage to the æsthetic sense of every healthy woman. The corset affords a way out of the difficulty.

Are Corsets Unnecessary.—Books and articles without end have been written in denunciation of the corset. There is no question of the harm done in many cases through tight lacing and the wearing of improper corsets. It need not be said, however, that corsets are in all cases injurious if they are well designed and properly fitted. The great difficulty, however, is that women depend upon the corset for their "shape." Many of them feel that they have no shape at all without this contrivance. Instead of being fitted to the corset, however, as is the case in most instances, the corset should be selected to fit the figure, and first of all every woman should have a figure of her own to which the corset should conform. Instead of being shapeless without her corset she should be shapely, and this is entirely a matter of physical development.

The torso of a woman, like that of a man, is normally supplied with a muscular structure which, when properly developed, really provides a natural corset for her. It is a corset of vigorous muscles which will keep her body firm and strong and beautiful. If these muscles are properly developed she will need no corset in order to give her shape. In present fashions in dress, and particularly in the wearing of separate

waists and skirts, involving tight waist bands, something in the nature of a girdle or corset may be required for comfort and for proper adjustment of the clothing, but no one should be compelled to wear a corset just to "give her a figure." She should depend upon the natural corset of the muscles of her waist line and abdomen. If these muscles are weakened and allowed to degenerate with an accumulation of fatty tissue, and particularly if the carriage of the body is faulty, then she will be truly shapeless and unpresentable without artificial support.

A strong back and an erect posture, however, should by all means be cultivated by women. Erect posture will mean a full and well-rounded chest and a retracted abdomen. Furthermore, some of the exercises illustrated in this section will be of special value for strengthening the muscles in the region of the abdomen and waist line in the manner desired.

Weaknesses of Women.—There is no question that the weak point in the case of many women is the pelvic region. The displacements of the female organs are the cause of great suffering and contribute to various nervous disturbances. A prolapsed or otherwise displaced condition of these organs is usually the result of a weakened condition of the ligaments involved and also of the adjacent muscles, organs and structures generally. By toning up and building strength in all these parts it is frequently a very simple matter to overcome difficulties of this type. Faulty carriage also has a great deal to do with weaknesses of this kind and should require special attention. All exercises, however, which tend to build strength of the external abdominal muscles will likewise favorably affect the pelvic organs, together with the digestive and other functional organs. Particularly commendable are those movements for strengthening the abdomen which may be practiced while lying down. In the case of prolapsed organs excessive exertion or muscular strain while standing may in some cases aggravate the trouble.

As a special means of relief in the case of prolapsus of the female organs and also as a means of building strength, reclining exercises performed on an inclined plane with the hips and feet higher than the level of the head, will be advantageous. In this case the force of gravitation tends to restore these organs to their normal position. One may take a large ironing board, placing one end of it upon the side of the bed, the lower end on the floor, and while lying with the feet elevated upon this board she may execute simple exercises for the legs, raising them to

the perpendicular, flexing the knees against the chest and devising other movements that will bring into play the abdominal muscles.

A still more effective type of exercise as a means of relief in such conditons is one which we have illustrated, in which the body is raised to a practically upside down position. This can be executed while lying in bed. If you have a brass or iron bedstead, take hold of the rods at the head of the bed with your hands, raise the legs first to a perpendicular position, and then stretching them still further upward, raise the hips and back until the weight of the body is practically supported by the shoulders, and the torso as well as the legs are held for a few moments in an upside down position. Study the illustrations carefully.

Apart from special exercises of this type the all-around building of strength and an improvement in the circulation, together with good posture and freedom from the constriction of corsets or skirt-bands which compress the lower part of the body, will be very effective by way of avoiding and also remedying many of the tormenting weaknesses of women.

Exercise for Constipation.—In connection with weaknesses of women the necessity for overcoming any tendencies toward constipation assumes special importance. All exercises that tend to strengthen the abdomen will be very effective in this direction, while brisk walking, rope skipping, dancing, tennis and active exercise generally, if one is strong enough, will be helpful. Deep abdominal massage, using a circular movement in the direction of the hands of a clock, will be valuable. In connection with such exercise and massage, dietetic measures will be necessary. One should drink freely of water and use plenty of fruit and green vegetables. White bread is the most common cause of constipation and should be avoided, together with cakes, cookies, crackers, crullers and white flour products generally. Instead, whole wheat bread or graham bread should be used. Bran is especially good, either used in muffins or mixed with one's cereal. All whole wheat or whole grain breakfast foods are satisfactory. Cheese, rice, tapioca, spaghetti and other starchy foods are likewise constipating and should be avoided. Fresh milk is sometimes conducive to constipation, and in a serious case it would be better to use buttermilk or fermented milk instead.

By following these suggestions on diet strictly, together with sufficient exercise and water drinking, stubborn cases of constipation may usually be overcome without the help of cathartic treatment. In a

serious case an enema will usually be found more satisfactory than a cathartic.

Exercise During Pregnancy.—If ever strength and health are desirable in the case of a woman, it is in connection with the trials of maternity. Physical weakness, under such circumstances, is responsible for much suffering and difficulty of recuperation. It is a well-known fact that the women of savage races experience very little of the weakness and difficulty in recuperating from childbirth that is prevalent in civilized communities. There is also some evidence that, to a certain extent, painlessness in childbirth may be enjoyed as a result of a normal, vigorous and healthy physical condition. If pain cannot be entirely avoided, at least in many cases it may be greatly lessened by proper physical preparation for maternity, in which the building of strength is an important factor. And in all cases exercise enables one to recuperate much more quickly and to avoid permanent weakening results.

The prospective mother should, above all things, get plenty of sleep and outdoor air. The inclination to remain indoors during this period "for fear of being seen" is little short of criminal in its results, inasmuch as it bears upon the health and vitality of the unborn child, as well as impairing the health of the mother. Nutrition is a most important matter at this time, and the lack of fresh air, by interfering with the appetite, is also indirectly detrimental in this way.

Walking is one of the most valuable of all forms of exercise during this period because of its vitality building influence. It should be made the special duty of every prospective mother to take a long walk some time each day.

Special exercises, however, are important for strengthening the abdominal walls and for promoting the health and vigor of all the bodily structure concerned. In these exercises the aim should be elasticity and suppleness rather than excessive strength. In other words, these exercises should not be carried so far as to produce an abnormal muscular development or a condition of muscular rigidity. It is best, accordingly, to employ active exercise of this type during the first three or four months of pregnancy, and thereafter to use less vigorous movements involving this part of the body, but particularly to depend upon daily long walks. Motoring and other pastimes which take one out of doors are particularly suggested. In the latter months of pregnancy special care should be taken to avoid any strain. Stretching or bending exercises

should then be taken with caution, and only to the point at which they are easy and comfortable to execute.

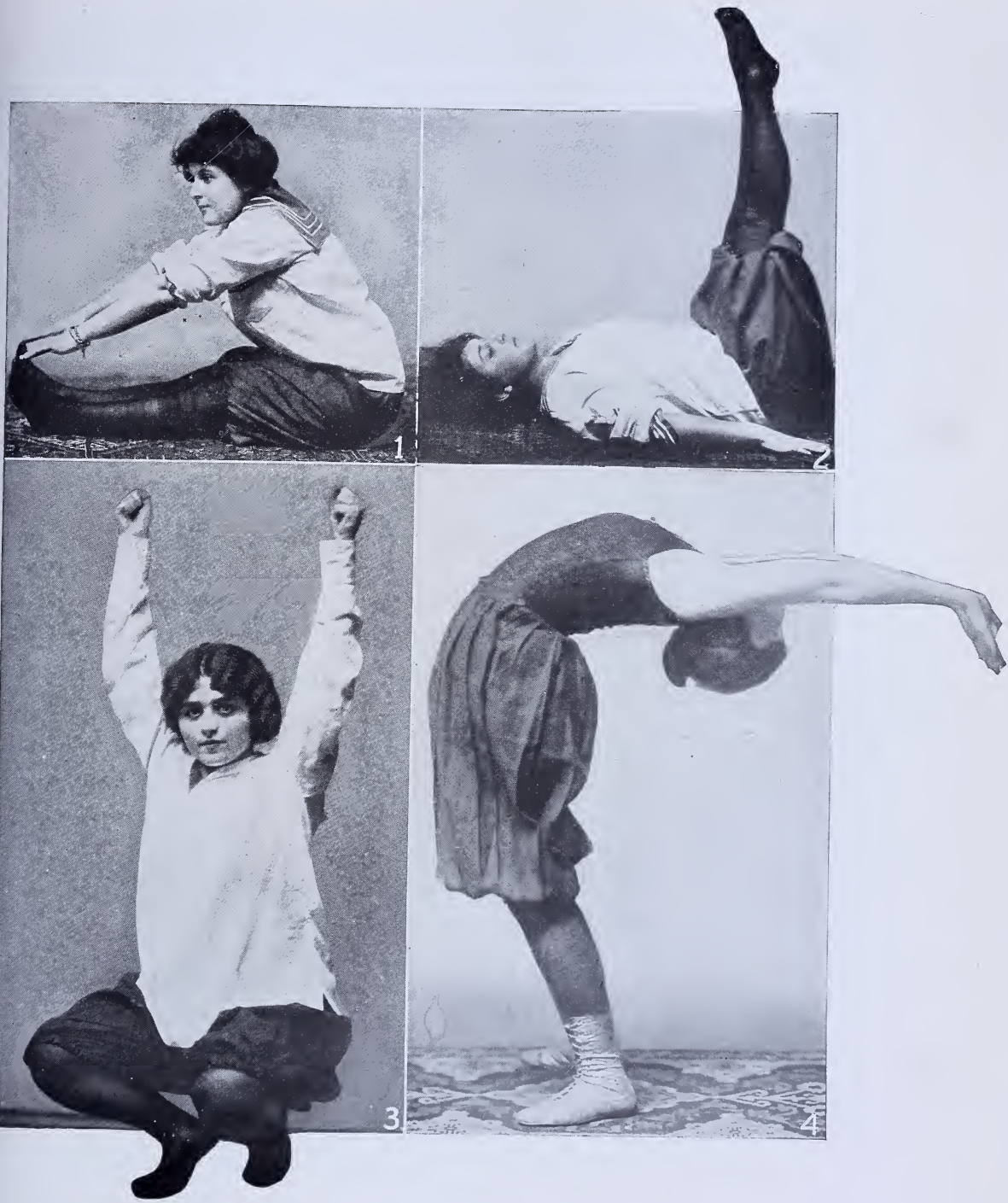
Bust Development.—The question of improving the bust is one of special interest in the case of large numbers of women. A normal bust development is invariably associated with a condition of vitality and perfect womanhood. In many cases a source of complaint is found in a lack of development and in other cases in excessive development, with the desire to reduce the bust. In either case, good results can usually be secured by physical culture methods.

Exercises which involve the muscles of the upper chest have a decided effect in improving the firmness and contour of the breasts. It cannot be said that in all cases exercise will increase the size of the bust, but in all cases it will increase their firmness and beauty. Where there is a tendency to droop this firmness has everything to do with their character and contour.

The increased size of the bust, where it is lacking or defective, must first of all depend upon improved nutrition and the development of vitality. The glandular structure depends upon the general health and active circulation, and to bring about an improvement in this respect all all possible measures that affect the general health must be considered. In many cases a general gain in health is necessary, requiring more sleep, better nutrition through appropriate foods, freedom from mental strain or worry, freedom from overwork and particularly as much outdoor life as possible.

The bathing of the breast with cold water may be particularly suggested. Massage, under such conditions, is likewise valuable, but it should never take the form of pulling or stroking downward because this will tend to increase still further any sagging or drooping of the parts. Massage strokes should take an upward direction.

It should be said that there is a widespread, popular misconception as to what should be the normal size of the bust. Under natural conditions and the most perfect health the bust should not be too large. It is only under conditions of maternity and approaching maternity that these glands are particularly enlarged. At other times they should be of only moderate size, and it is only under such conditions that the most perfect contour can be maintained. When the breasts are too large it is almost impossible to prevent their drooping or hanging. A study of works of art, both antique and modern will show one very quickly that the perfect bust is not excessive in size.



General Exercises for Women. 1. Sitting on the floor, stretch the fingers forward to the toes, or farther, if possible, repeating several times. 2. Lying on the back, bring the legs to the perpendicular position shown, then down to the floor, and repeat until slightly tired. 3. First standing erect with arms at sides, bend the knees and lower the body to the squatting position shown, at the same time swinging the arms high above the head. Lower the arms when rising. 4. Bend and stretch backward as well as you can for a moment, rest and then repeat. This is a superb exercise for back, chest, stomach and abdomen.

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Exercises for Grace and Agility.. 1. With hands on hips, jump to the position shown, with feet wide apart. Next, change positions of the feet with a little jump, bringing the left foot forward. Also, in this position, twist or turn the body first to one side then to the other. 2. Standing first with feet together, jump to the charging position, with arms outstretched. Return and charge in the same way with the other foot forward. These exercises should be executed on the toes. An exercise for chest and bust is shown in 3 and 4. With the arms outstretched at sides, and well back, bring them forward and cross in front of the chest as far as possible. Swing back and repeat.

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An exercise for the bust shown in 1 and 2. Reclining, and with some small weights in the hands, stretch the arms up and back. Then bring them downward and cross them over the chest as shown in 2. 3. An exercise for the abdomen. Lying on back, rise to sitting position. This will be easier if arms are folded in front. If necessary use a weight to hold the feet down, or thrust them under some piece of furniture. 4. An exercise for the back, raising the hips as high as possible in the position shown. Another simple exercise, of special value to female weaknesses, is to raise the hips high with the weight on the shoulders instead of on the elbows.

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1. Doubling one knee hard against the body, alternating with each leg. An excellent exercise for remedying constipation. 2. An exercise for the back. Sit on the floor, place hands on the floor a little ways back, and then raise the hips, as illustrated, until the body occupies a straight line. 3. An exercise for developing and improving the hips. Assume a position on hands and feet, then raise one leg at a time as high as possible. Try to raise the leg a little higher each time, and repeat a number of times with each leg.

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Some bed exercises especially suited to women, and helpful in weaknesses of women. 1. By taking hold of the bedposts in this way all leg movements can be more perfectly executed. A good preliminary position. Resting with the foot of the bed or couch raised will give relief for prolapsed organs. 2. Raise the head and shoulders by clasping the knee with both hands, and pull yourself up to a sitting position. In this way there is less strain upon the abdominal muscles than when rising to a sitting position with such help from arms and legs. Alternate legs. 3. A twisting exercise for the abdomen and trunk. Lying on the back, swing the left leg far over to the right side, stretching as shown. Same with the other leg.

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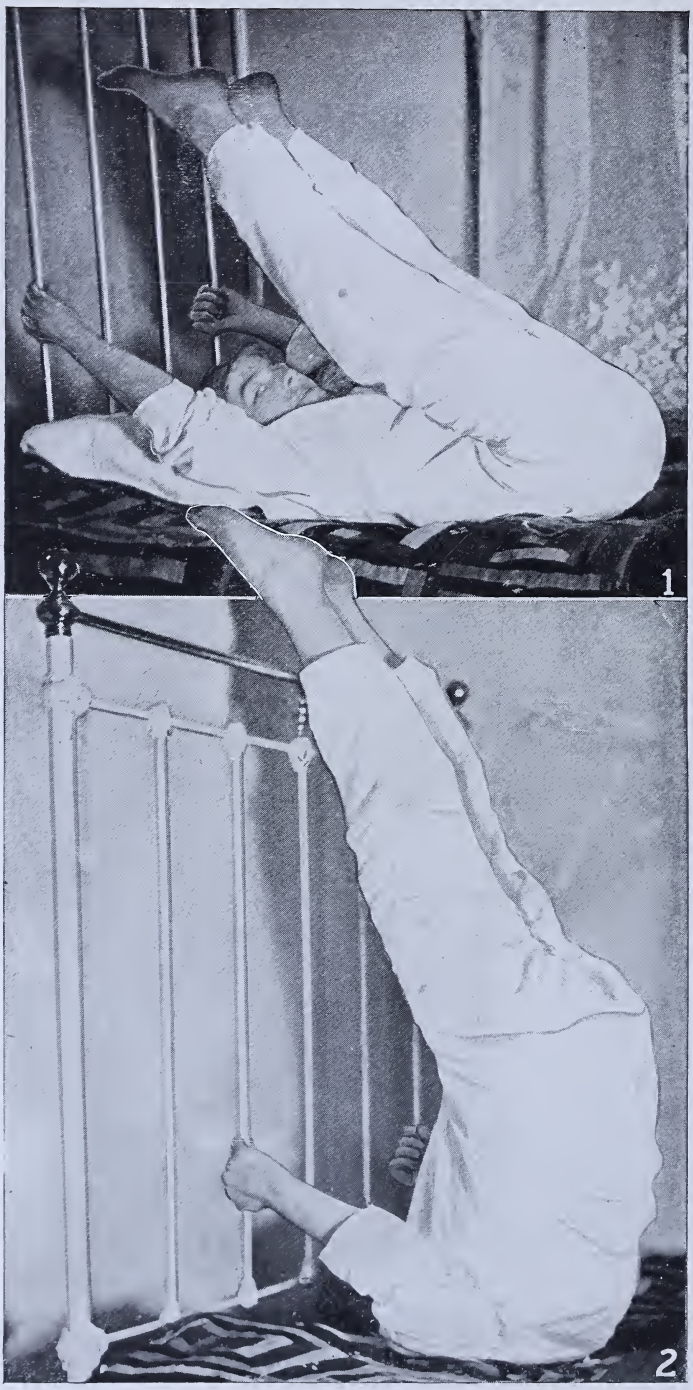

An effective exercise for relief in falling of the womb or other female weakness. 1. First lying on the back, raise the legs to the position shown. Then, pushing upward, raise the hips and finally the back, finally stretching upward to the position shown in figure 2, with the weight on the shoulders. Hold this for a few moments, return, and repeat two or three times. In the case of fallen organs, this exercise causes them to return to their normal position through the simple force of gravitation.

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Apart from exercises for the muscles of the chest, the appearance of the bust depends very large upon proper carriage and the development of the chest. A good bust is impossible in connection with a flat-chested condition. If the chest is round, full and well developed, and the carriage erect in such a way that the chest is properly raised, a bust of moderate size will assume its true proportions of harmonious outline and symmetry. One cannot, therefore, pay too much attention to improving the conditon of the chest as a whole.

The reduction of the bust when too large is a much more difficult matter in many cases, and if one is over-weight it will be necessary to employ special reducing methods for the entire body. Massage is especially advantageous for bust reduction, and kneading with a circular movement is to be suggested. The exercises already mentioned for bringing into play the muscles of the upper chest are of even more importance, if anything, as a means of removing the superfluous fat. These should be practiced at least two or three times each day. The bathing of the parts with cold water is likewise especially valuable for improving the circulation, oxidizing the adipose tissue and for improving their firmness.

The Thin Woman.—It is not generally recognized that a lack of flesh upon the part of women is to a large extent the result of a lack of physical development. It is quite true that it frequently means poor nutrition and a lack of vitality, but nutrition is improved in part by exercise and the better appetite that comes with exercise and open-air life.

At the same time, a thin arm means an undeveloped arm. A body not properly filled out means one lacking in general muscular development. A thin woman, often of a nervous temperament, cannot afford to waste her energy in an excess of exercise, but she should persistently and systematically exercise every part of the body by a little really energetic exercise each day. By using each and every muscle only a little bit, but with sufficient effort to prove to Nature the need of greater strength, Nature will respond by building strength and developing the muscles. As a woman builds up her muscular structures she will enjoy improved functional tone and her flesh will be rounded out in the manner that is natural to her when in good health. Physical stagnation is just as detrimental to a woman as to a man.

Recreational Exercises.—It is true that outdoor recreations cannot take the place of systematic movements in improving the body, but they

have a marked constitutional effect and are also helpful in the case of women for developing grace, agility and muscular control.

Dancing is a form of activity particularly well suited to the physical requirements of women. Although not necessarily an outdoor exercise, it is best practiced in an open-air pavilion. The ordinary social dances are valuable, though to a less extent than folk-dances and fancy dances of various kinds. Toe dancing alone is somewhat artificial and unnatural, although even that is not really harmful in any way, and would be helpful.

Tennis is well suited to women and many of them become fully as expert as the best male players. It is an active game, but without any special strain for those in condition to play it. Rope-skipping may be made very interesting with a study of fancy steps, and is valuable for women, although where there is prolapsus of the pelvic organs one should strengthen these parts before attempting rope-skipping.

Swimming is an ideal exercise for women inasmuch as it is particularly well suited to their bodily structure. Fencing is another active and enjoyable competitive exercise, conducive to grace and muscular control. Other games and sports may be recommended for those to whom they naturally appeal.

For Women Who Worry.—Worry may often be overcome by relaxation exercises or some active and stimulating form of exercise, such as tennis, rope-skipping, running or dancing. Such activity will take one out of the mental rut of her worry. By overcoming physical depression one also overcomes the mental depression associated with it. By arousing an active circulation and stimulating all the bodily forces, one takes an entirely different view of things. By promoting deep breathing and by thus changing the blue blood into red blood the "blues" will naturally fade away. There is no other possible means of overcoming worry that is so effective as stimulating exercise, although where there is any liver trouble, dyspepsia or constipation as a fundamental cause of this mental condition, proper attention should be given to these disorders.

Relaxation Exercises.—For nervous persons generally and especially for women of nervous temperament, relaxation exercises are of great value. They enable one to overcome that condition of nervous tension which is, in many cases, such a waste of vitality. Learn to relax. One may train herself to "let go" of the tense muscles, and in that way relax the nerves. We have voluntary control of our muscles and through their use we may, to a large extent, control our nerves and mental states.

The most convenient relaxing exercises are those performed lying on a soft bed, with a good spring. Raise one foot at a time ten or twelve inches, hold it for a moment and then relax, letting it drop absolutely limp upon the bed. Repeat several times. Then try it with both legs together. With the arms at the sides raise them a few inches and let them drop seemingly lifeless. Raise the head and shoulders two or three inches and then let them drop back relaxed. Next with the weight on the shoulders and feet raise the hips and back three or four inches from the bed, hold the position for a moment and then let the body drop limp upon the bed. It may bounce if properly relaxed. By frequent repetitions you will readily learn to relax the muscles voluntarily, and by overcoming the tightness or muscular tension you will at the same time relax the nerves. Those who have difficulty in going to sleep should practice these relaxing exercises on going to bed each night.

Similar relaxation movements can be performed while standing by raising one arm or one leg at a time and then letting it drop limp, swinging loosely at the side. Another excellent movement is to let the head suddenly drop limp upon the chest, with arms swinging loosely. For another, hold the arms extended in front, hands hanging limp from the wrists, and then shake the hands loosely.

Cold Baths for Women.—The effect of cold bathing in the case of women is exactly the same as in the case of men, and what we have said in the section on physical culture in regard to bathing, air baths, sun baths and friction rubbing will likewise apply to women, although in the matter of cold bathing women of limited strength should be especially careful. It is, of course, advisable to avoid cold bathing during the monthly periods, and to be careful about exercise at such times unless very strong.

Clothing.—The dress of women has such an important influence upon physical activity and health that a word on the subject is necessary. We have already referred to the influence of the corset, though it should be said that when avoiding a corset the wearing of tight skirt-bands and the weight of heavy skirts may be even more serious. Any form of clothing which permits free bodily movement may be suggested, and princess gowns, house dresses and other forms of apparel which are supported from the shoulders should be much used on general principles. Hose supporters, if possible, should be suspended from the shoulders rather than from the waist. Skirts should be as light as possible, fairly full and fairly short so as to give the greatest freedom in walking.

A gymnasium suit, being naturally intended to provide for the greatest freedom of movement, would likewise be especially valuable for purposes of housework in the privacy of the home. Such a plan is to be highly recommended and would undoubtedly mean improved health and a more perfect bodily development.

Probably the greatest offense against the body in modern clothing is found in our conventional foot-gear, especially that of women. The only perfect foot covering would be a moccasin or sandal, that gives the muscles of the human foot the same freedom that it enjoys when bare. Going barefooted will cure most foot troubles. Sandals are also suggested for this purpose. Shoes, as nearly as possible, should approach the outlines of the human foot. There should be plenty of room for the toes, and the big toe should occupy a position following the straight inside line of the foot. Shoes should fit snug around the instep or shank, but with room to double the toes inside of the shoe. Square-toed shoes are not necessary if the straight inside line is followed and there is plenty of room for the toes. The ordinary pointed shoe, however, is built on very bad lines.

The addition of an artificial heel to the shoe is undoubtedly one of the greatest crimes of the shoemaker. Nature would have supplied us with a natural high heel if it were desirable. The high heel places a strain upon the entire foot, and by throwing the body out of balance it places a strain upon the spine, and to some extent upon the pelvic organs. High heels are a common source of nervous disturbance. The flat heels found in tennis shoes and in the so-called "spring-heeled" shoes of school children are to be recommended.

Extremes of Dress Reform.—For sensible attire extremes in dress reform are not necessary if only the comfort and freedom of the body are permitted in the clothing worn. It is not desirable for women to adopt the dress of men. It is perfectly natural that the clothing of the two sexes should be absolutely distinctive. Soft, clinging fabrics are especially suited to the feminine nature and bodily requirements, while strong, firm fabrics and more severe or formal outlines are suited to the masculine nature and bodily conformation. The secondary sex characteristics of men and women are so distinctive that it is only natural that the clothing of the two sexes should harmonize with these differences. Masculine attire for women, therefore, has no sound basis, but sensible and comfortable dress is a matter that directly affects the health of everyone.

PHYSICAL CULTURE

PART III.

PHYSICAL TRAINING FOR CHILDREN.

Strength in Childhood.—All mothers and fathers wish their children to be strong and healthy. Many youngsters are naturally so. It is partly a question of being born with a vigorous constitution, and this depends largely upon the health and vitality of the parents.

But only taking into consideration the children after they are here, and especially those who are born not exceptionally rugged, is it possible to improve their physical make-up? Can vital resistance, red-blooded health and all-around strength be cultivated in the infant and the child? Assuredly. The child with a naturally strong constitution undoubtedly has an advantage over those less favored by nature, but by proper methods the latter may also attain a satisfactory degree of strength and health.

To a large extent the physical improvement of children is a matter of proper food, fresh air, sufficient sleep, appropriate clothing and other factors tending to build vitality and promote health. Not one of these can be ignored. Probably the first in importance is the question of nutrition, and without doubt the greatest of all mistakes are to be noted in this quarter. But there are also mistakes enough in connection with these other requirements to prevent the satisfactory growth and development of many children.

Children need all the sleep they can get. Up to five years of age, if possible, they should sleep two or three hours each afternoon. They need almost continuous fresh air. They should practically live out of doors the year round. Their diet should be plain, wholesome and nourishing, with an abundance of milk, with no food allowed between meals to spoil the appetite, and especially with no cheap candy to overtax the

liver, spoil the teeth and interfere generally with good nutrition. All these influences are of the greatest importance, but in this particular place we are concerned chiefly with the strengthening of the children through play and exercise.

Play Versus Exercise.—Most children, if unhampered by the artificial restrictions of civilized life, would secure sufficient exercise from the spontaneous activity of play. Play is the one great and universal means of strength building and education. Young animals educate themselves through play. In the human race play serves as a means of both physical and mental education. The child first develops its mind through the use of its muscles. Continuous activity is the one invariable characteristic of all healthy children, and it may also be said that under many conditions play is the very best form of physical training. At least this is true of those children who are naturally strong and energetic.

But play has certain limitations where bodily defects of any kind are concerned and where the children are inclined to be frail. Under such conditions, special attention will be required. Systematic and persistent exercises directly affecting the weakened parts will bring about a condition of symmetry and harmonious strength, and this result can be gained in no other way.

Outdoor Play.—We may say that those children who are so full of energy that they are constantly on the move and simply cannot keep still, will usually need no special attention in the way of physical culture. You cannot do better than to turn them outdoors into a nice, grassy yard, where they will have full freedom to wrestle and run, to push and pull, to roll and romp and play all kinds of games that may appeal to them. Depend upon it, such children will take care of themselves in the matter of strength and healthy growth. All they need is good food, plenty of sleep, outdoor play-space and such clothing as will not interfere with their bodily activities in any way.

It is important that girls should be sensibly dressed so that they can play absolutely the same type of games as the boys. Dainty and pretty clothing will do very well for Sunday, but for the play hours the clothing of girls as well as of boys should be serviceable in color, texture and construction. Little girls, by way of underclothing, should wear bloomers which will give them full freedom to climb trees, if desired, or to run, wrestle and romp as much as they choose.

The confinement of city life is almost a crime against childhood. If possible, children should be raised in the country. Even the best ven-

tilation cannot make indoor rooms as satisfactory as the open air. The outdoor world and the sunshine are absolutely essential. A nursery or play-room in the house may be advantageous in extraordinarily stormy weather, but in the case of ordinary snow and rain the children should be provided with suitable clothing and be allowed to stay out of doors. When raining they may wear appropriate rubber coats, rubber boots and helmets such as will permit them to run around out in the open just the same as in clear weather. They may enjoy it even more.

If the little folks must play indoors in the winter-time, then give them a room well provided with windows, open the windows wide and let them put on their sweaters, overcoats, gaiters, mittens and caps so that they will be provided for the cold air just about the same as if out of doors. Every nursery and playroom should be as nearly as possible an outdoor playroom, so that the children will have good health, good appetites and beautiful rosy cheeks. Much emphasis is here placed on this particular question of fresh air because it is, if anything, even more important than any method of exercise. Furthermore, fresh air is so conducive to energy that the children will naturally turn to active play. And the more noise they make, the better. It indicates a healthy, normal childhood.

But if open air life is of such value in the case of rugged and vigorous children, it is even more important where delicate children are concerned. The latter should not be sent to school too early but should be kept out of doors and, if possible, arrangements should be made on any convenient porch, balcony or roof, or possibly in a tent, for outdoor sleeping.

What Children Need Exercise?—The children who particularly require physical training are those who are thin, pale and generally delicate. The child who plays only with blocks and picture cards, who prefers to sit on a rug rather than to run about, who never makes any noise and whom his parents regard as a very, very "good" little boy, will need special attention. Those who are always running, wrestling and fighting will get along well enough, but the quiet child and especially the nervous child should be encouraged in the direction of active play and in all forms of outdoor life. He should not be exhausted by a too strenuous program, but he should be given enough exercise to make him muscularly tired, to make him sleep better, to improve his appetite and in that way to bring about a revolutionary change for the better in his entire physical make-up.

Children who are of an excitable nature or who suffer from hysterical tendencies should be discouraged in mental pastimes and kept out of doors. Having a mental temperament, these children usually learn very quickly at school and one can afford to let them start their school life later than the average child. Give them a chance to build up a vigorous physique.

Those having weak eyes or eye defects should be discouraged in pastimes involving eye strain, such as playing with pictures and books. The eyes of young children are really suited to fairly large objects at a little distance. They should have large balls to play with, shovels, digging implements and other things that do not call for close concentration of sight. In fact, this is true of all children. Kindergarten work, because frequently trying on the eyes, is of doubtful value. All such children should have their eyes thoroughly and carefully examined, and when necessary glasses should be used to remove any eye strain until the eyes become stronger. The eyes invariably improve with better general health.

Adenoids are usually developed from a lack of outdoor air and active play. When once established they should be removed as soon as discovered, but they may be prevented just as swollen tonsils may frequently be prevented by open air activity. Mouth breathing should be avoided. Defective hearing is often catarrhal in origin, and the building up of the general health will usually mean an improvement in the hearing.

Corrective Exercise.—Bodily defects can usually be remedied far more successfully in childhood than in later life by special and systematic exercise. All gymnastic work is somewhat corrective in character, though to get the best results this work should be individualized, depending upon the personal requirements of each child. For round shoulders, spinal curvature and conditions in which one shoulder is lower than the other, stretching and body bending exercises are effective. Stretching the arms high above the head, swinging by the hands from a horizontal bar and twisting the body at the waist should be diligently practiced. If one shoulder is lower than the other, that shoulder should be stretched upward repeatedly. Let the child place a pencil mark on the wall as high as he can reach. Let him each day strive to stretch still higher to beat his previous mark. Wrestling and all physical exercises for the back will likewise tend to improve this condition. Bodily posture, both standing and sitting, is most important. The erect position can best be secured

by stretching the arms high, also by bringing the arms back, thus pulling the shoulders backward. This exercise will likewise raise and expand the chest, overcoming any flat-chested tendency.

Where the abdominal muscles are weak, and especially where there is constipation and digestive weakness, bending exercises and those which double the legs against the body will be useful. Let the child lie on his back, hold his feet steady, and then let him raise himself to a sitting position without the use of his hands. Also, while hanging by the hands, let him raise the legs to a horizontal position.

In any tendency to bow-legs or knock-knees all strengthening exercises for the legs will be useful, particularly deep-knee-bending, or squatting and rising. Mechanical pressure or rubbing, either outside or inside the knee, as required, may have some effect in childhood, although these defects cannot be altered at or after maturity. Good food has much to do with it, and milk should be used freely.

For weak ankles or flat-foot there is nothing like going barefoot. If a child seems to favor one leg—that is, stand mostly on the other foot—he may have some weakness in this direction. Sandals and moccasins are just about as good as going barefoot, but all possible exercise for the legs and feet should be encouraged to strengthen the weakened parts. Skating, dancing, rope-skipping and running are very effective if one can practice them. Foot exercises, such as rising high on the toes and on the heels, bending the feet inwards and outwards and also circular movements of the feet are remediable in such cases.

In the same way weak hands and wrists may be strengthened by exercises with a broomstick, using especially a competitive game in which two children try to pull or twist the stick away from each other.

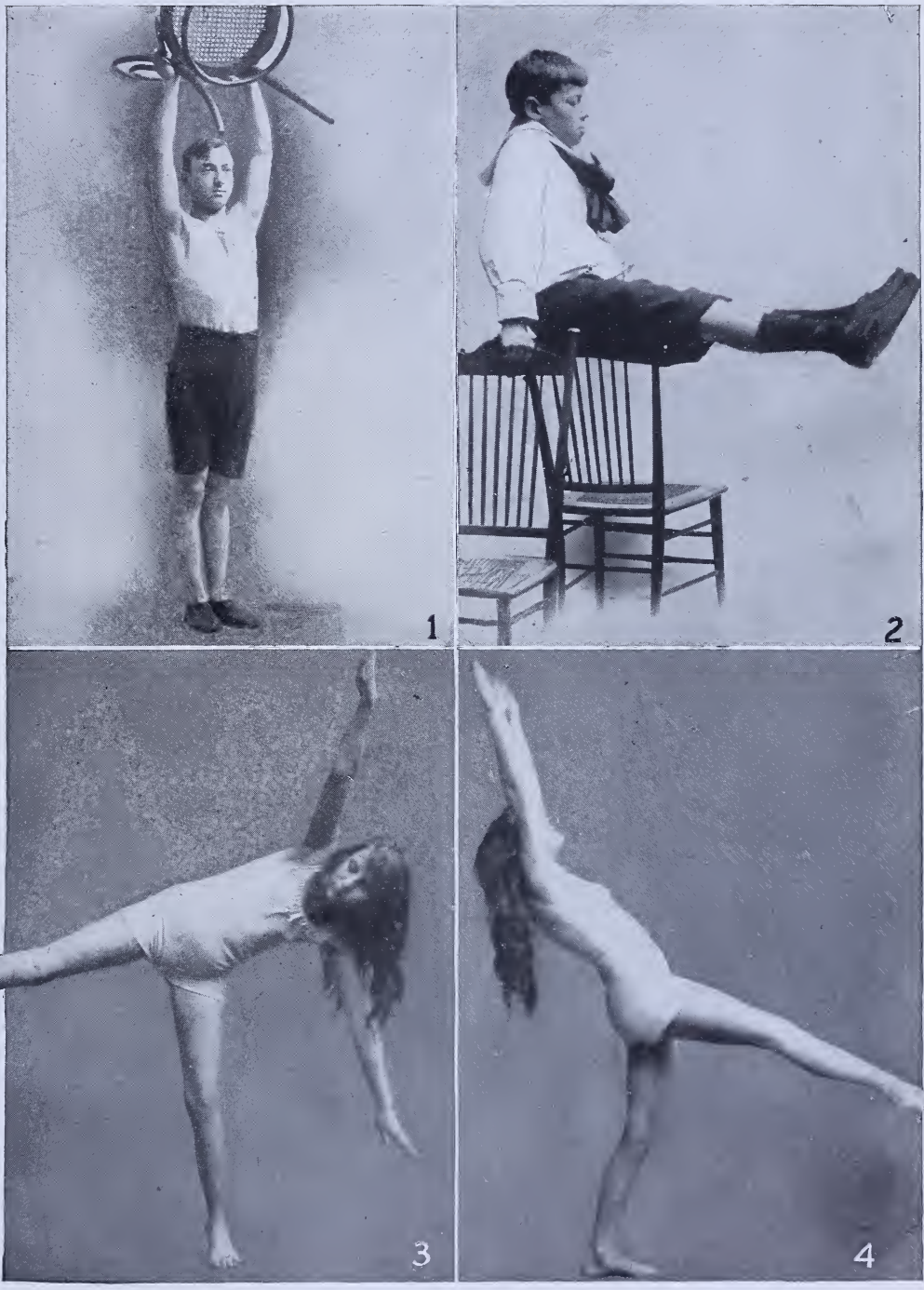
A thin neck usually goes with an undeveloped and delicate condition of body generally, and all kinds of development exercises are necessary together with special movements for the neck itself. The latter should consist of bending the head far backward and forward and far to each side, as well as twisting or turning the head. By way of advanced exercises, after some strength is developed, the weight of the body should be partly supported by the head while lying on the back and also in a position face downward. In the latter exercise first get down on hands and knees, place the head on the floor, then lift the hands and if possible the knees. A good strong neck is always associated with a condition of vitality.

How Much Exercise.—There should be no forcing of the child's

growth and no excess in exercise. Do not strive for feats of strength or to make a circus performer of the youngster. Such "stunts" as throwing the child high in the air, tossing him up for somersaults and dangerous feats of any kind should be avoided. Exercise should be intended merely for a normal development and healthy growth. Beyond this, training is not advisable. When the child shows the least lack of pleasure in the exercise it is probably time to quit.

How Children Should Exercise.—So far as possible, even systematic or special training should take the form of play. It should be made pleasurable, and if the parent will take an interest so as to make it as much "fun" as possible there will be no difficulty in keeping the child's interest. A great many exercises can be employed in the form of stunts or tricks, and where there are several children they can compete with each other in doing them. Who can stretch the higher? Who can make a better backward bend? Who can balance longest on one foot in certain stretching feats? Who can expand his chest the most? Who can raise his back the highest when lying on his back with the weight of the body on the feet and head? The competitive or play spirit in all such exercises will help greatly.

Competitive Games.—There is a great variety of competitive games and exercises that may be especially suggested for all-around development. Hand wrestling is ideal for children. Taking a firm position, with feet well apart, let them "shake hands" with the right hand and then see who can pull, push or jerk the other out of balance so as to make him move his feet or touch the floor with his other hand or any part of the body. This is splendid exercise. After five "falls" change off to the left hand. Ordinary wrestling is a superb exercise for boys if practiced on the grass. It will be advantageous, however, to study wrestling holds. There is a simple "tug-of-war," in which two children, taking hold of the same broomstick and sitting down with the feet braced against each other, try to pull each other over. Let the two take hold of a broomstick high above the head and bring it downward between them, each one trying to twist the stick in the hands of the other. This requires and develops a tight grip. There is a great variety of exercises of this type, all appealing to the mind of a child and all valuable. If gymnastic apparatus is available it will be a great help, but it should not be taken seriously. The children should not strive to make records or to do difficult feats. They should simply "play" on the apparatus so



Children will find an ordinary chair a satisfactory piece of exercise apparatus. 1. Using a chair for a regular exercise drill. 2. A good "stunt" for boys, performed on the backs of two chairs. 3. Combination balancing and stretching exercises are splendid for girls, developing grace and muscular control. This is a good example. 4. Another balancing exercise of great value, to be performed on each foot alternately.

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Competitive games and exercises particularly appeal to children, and should be encouraged. 1. "Rooster fight." With arms folded, and hopping on one foot, each tries to "bump" the other over, or make him put down the other foot. 2. A typical wrestling hold. Wrestling is an ideal exercise for naturally rugged children. 3. Testing the grip. Let each grip the broomstick tightly, and then try to make it turn in the other's hands as it is brought down between them. 4. Hand wrestling is a clean and delightful sport. Taking this position, each boys tries to pull, push or jerk the other off his balance. To move either foot or touch the floor means a fall.

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as to get the most fun. For girls, folk-dancing is especially suited. Simple balancing exercises will give grace, poise and bodily control.

Children are not suited to endurance work. Their exercise should be active in character, but not long continued. There should be a variety in their exercise. This is one reason why baseball is a splendid game for boys old enough to play it.

The Slender Child.—Slenderness in itself does not indicate a lack of vigor. Children, like adults, are of various types. Some are naturally more short and stocky, while others are taller with light bones. The frail child is thin from lack of development, but the naturally slender child may be only light-boned, and may really be in perfect health, with good color and remarkable strength and vitality for his weight. Such a child is usually a good runner and very active. but when the slender child is pale and inactive, with a thin neck, drooping head, round shoulders, a flat chest and pouchy abdomen, he needs a rigid course of physical training

From the age of twelve to sixteen or seventeen some children are slender because of growing tall very fast. Their vitality is often expended in this rapid growth and they may not have the stamina of boys and girls who have grown more slowly and who have filled out more during the process. These apparently "over-grown" young people will fill out later if in good health, but they should not attempt to compete in athletic games with others of their height simply because they are tall. They cannot be expected to have the same endurance. Athletic work for all young people during the period from boyhood or girlhood to manhood and womanhood should be carefully supervised. Athletics are undoubtedly of great value, but in occasional instances may be carried too far if not closely looked after. Athletic directors are supposed to look after this, but it should be the duty of every parent to take a personal interest in the matter.

Exercise for Babies.-A healthy baby, as a rule, requires no special exercise. What he needs most of all is sufficient freedom in his clothing to allow him to kick and use his arms. Babies should not be bundled too much. An air bath once each day in a warm room will be of great value. This may precede the daily bath. Place the baby on a heavy quilt on the floor and let him kick, roll and wiggle. In this way he will gain the strength that will enable him to creep when he gets ready for it.

Passive exercises may be given the baby by moving his arms and legs in a manner suggested by ordinary calisthenic work. Such movements will stretch his little body, expand his chest and improve his

circulation. Take the little arms, raise them above the head, then down, draw them out to the side and then back. Double the knees up against the chest, then straighten them. Put the child through a variety of other movements. Let him take hold of your fingers and then partially lift him. You will soon find that he can sustain his entire weight by his grip. Massage will be especially valuable, kneading the arms and legs lightly but thoroughly, and especially massaging or rubbing the back, chest and abdomen. A quick, circling movement is especially suggested for massage of the back, chest and stomach. This massage, if used, may follow any exercise given and precede the bath. When the baby learns to creep or hitch this will mean a great deal of exercise. He should not be forced or urged to walk until he does it of his own accord.

BOOK XVIII

Is a treatise on Full or Complete Breathing as practiced by the Hindu Yogis, together with a series of Remedial Exercises designed to correct bodily infirmities.

Breath, Cleansing 1696
Nerve Vitalizing 1696
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Cleansing Breath 1696
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REMEDIAL EXERCISES

Abdominal Organs, Exercise for 1704
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Book XVIII

THE SCIENCE OF BREATH

THE RESPIRATORY SYSTEM.

It is an axiom that "breath is life." It may likewise be said that the manner of breathing vitally affects the length of life, yet few people appreciate the significance of this fact.

Breathing is dependent upon the organs of respiration—that is to say, upon the lungs and the air passages leading to them. There are two lungs, separated from each other by the heart, the large blood-vessels and the large air tubes, each being connected with the heart by arteries and veins. The lungs themselves are porous and spongy, their tissues having great elasticity. They are covered by a sac or thin double wall, known as the pleura, one side of which is attached to the lungs and the other to the inner walls of the chest. The pleura secretes a fluid which acts as a lubricant to the inner surfaces involved, and enables them to glide upon each other without friction in their respective movements in breathing. The pharynx, larynx and the windpipe or trachea, together with the bronchial tubes, form the air passages to the lungs. Nature intends that we should draw air into and expel it from the lungs through these passages and has provided the nose as the medium of passage. These are provisions of nature, yet a considerable percentage of humanity breathes chiefly through the mouth. In breathing air through the nose the temperature is properly regulated by mucous membranes especially adapted to the purpose. In breathing through the mouth this design of nature is frustrated. In breathing through the nose not only is the air modulated to the temperature which the lungs require, but it is freed of germs detrimental to the lungs. In breathing through the mouth a false medium is employed and the air passes into the lungs without divestment of germs which the nose channel would have thrown off.

Air is drawn into and expelled from the lungs by action of the diaphragm, a strong, flat, sheet-like muscle lying across the chest and separating the chest-box from the abdomen. When the diaphragm expands the elastic lung tissues are correspondingly stretched and the lung cavities thereby enlarged, creating a vacuum, into which air from without is drawn; when the diaphragm relaxes the air is expelled. This action of the diaphragm is almost as automatic as that of the heart, but unlike heart-action it may to a very considerable extent be controlled by will-power.

In a consideration of breathing it is necessary to have in mind the manner of the circulation of the blood. By the heart's action the blood is forced through the arteries and capillaries to all parts of the body and then returns to the heart through the veins, which are reached by capillaries throughout the body. After regeneration by medium of the capillaries of the lungs, the blood, in a red, rich condition having life-giving properties, passes through the left auricle into the left ventricle, and thence through the arteries and capillaries, distributing its life-giving properties to the body as it goes, but as it returns through the veins it picks up the waste materials of the system and reaches the right auricle of the heart, blue in color and robbed of its life. As this auricle becomes filled it contracts and drives the blood through an opening into the right ventricle of the heart, from whence it is forced into the lungs and distributed by millions of hair-like blood-vessels to the air cells of the lungs. The texture of these blood-vessels of the lungs is sufficiently dense to prevent any outlet of blood, yet porous enough to permit the passage of oxygen which has reached the lungs in breathing, and this oxygen if received in sufficient quantity drives out the impurities, and the re-oxygenized blood passes from the blood-vessels of the lungs through the left auricle of the heart to the heart's left ventricle, from whence it is again forced through the arteries. When it is remembered that in the ordinary man approximately 35,000 pints of blood pass through the capillaries of the lungs each twenty-four hours, it will be evident that unless fresh air reaches the lungs in sufficient quantity the poisoned blood cannot be fully purified and waste products which should have been eliminated must return to and poison the system. When properly oxygenized by fresh air not only is the poison in the blood eliminated, but the newly-charged blood carries some twenty-five per cent. of free oxygen which in its arterial course it distributes to all the cells, tissues, muscles and organs of the body, even the lungs themselves. Insufficient oxygen means imperfect elimination of poisonous matter and consequently poor nutrition and ill health.

For proper re-oxygenation of the blood as it passes through the blood-vessels of the lungs it is not sufficient for the air to merely reach certain of the air-tubes of the lungs, but that it should reach every part of all the air cells, and this cannot be accomplished unless the manner of breathing through the nose and so regulating the action of the diaphragm that it will produce the requisite inhalations and exhalation of the lungs, and this action of the diaphragm can be regulated by the will in the same manner that an arm may be raised or a foot extended. This means full or complete breathing and implies more than is commonly meant by deep breathing. In shallow breathing only a portion of the lung cells are reached, the blood is correspondingly imperfectly oxygenized and the whole system suffers in proportion to the under-oxygenation.

Reverting to the nose and mouth as mediums of breathing, man's mechanism is so constructed that he may breathe through either, but nose-breathing properly exercised brings health and strength, while mouth-breathing cannot but result in weakness and disease. Many diseases to which man is subject can undoubtedly be attributed to the ill, but common habit of mouth-breathing. Every mother should carefully watch her infant, close its lips and bring about the habit of proper breathing. When the child seems inclined to breathe through the mouth, the error may usually be corrected by tipping the head slightly forward when asleep. This causes the mouth to close and forces the nose to perform its functions. Contagious diseases are much more easily contracted by mouth-breathers than by nose-breathers. The nostrils have natural protective apparatus which filter all air as it passes through and do not permit obnoxious ingredients to pass to the lungs. Mouth-breathing, on the other hand, permits the passage to the lungs of germ-laden dust and other deleterious things and not only so, but permits air to pass which is not adapted to the sensitive requirements of the lungs in the matter of temperature and therefore causing inflammation of the respiratory organs. In nose-breathing the impurities which are stopped by the mucous membranes of the nostrils are duly thrown off by exhalation and should they by any means have penetrated beyond these membranes, they are usually still thrown off because of an irritation in the nostrils resulting in a sneeze, which ejects them. This does not happen in mouth-breathing. Those who have been habitual breathers through the nose are seldom troubled with clogged or stuffy nostrils, but those who have been addicted to mouth-breathing may find that the nose to a certain extent has lost its facilities and may be subject to clogging. In such cases the nose should be thor-

oughly cleansed each day with tepid water, which may be administered through a small glass nasal douche, purchasable from any druggist, or in lack of such by snuffing the water up the nostrils, permitting it to run down the nasal passages to the throat and then ejecting it through the mouth. Each morning it will be found well to stand in front of an open window, close one nostril with the finger and breathe the air through the open nostril, repeating this several times, changing from one nostril to the other. A little vaseline or camphorated ice rubbed in the nostrils at time of retiring and placed as far up as the little finger will reach will be found very beneficial in such cases.

The mechanical arrangements of respiration manifest themselves through: (1) elasticity of the lungs, and (2) the activity of the thoracic cavity (commonly referred to as the chest), in which the heart and lungs are contained, and which is bounded by the spinal column, the ribs with their cartilages, the breast bone and the diaphragm. There are twenty-four ribs, twelve on each side, emerging from the spinal column. The upper seven pairs which are fastened directly to the breast bone are called true ribs, while the lower five pairs which are not fastened to the breast bone are known as false or floating ribs, the upper three being fastened by cartilage to the other ribs, the remaining two pairs having no cartilages and being free at their forward ends. The ribs move in respiration by means of two muscular layers called the intercostal muscles, being affected by the action of the diaphragm, which separates the thoracic cavity from the abdominal cavity. Without action of the diaphragm and its dependent intercostal muscles the lungs cannot expand, and upon the extent of the action of the diaphragm the sufficiency or insufficiency of the air taken into the lungs depends. A proper control of the action of the diaphragm is therefore necessary in order to secure proper lung expansion and send properly oxygenized air through the arteries to the cells and tissues of the body.

Respiration may be divided into four classes, namely: high breathing, mid breathing, low breathing and full or complete breathing.

In high breathing the ribs are elevated and the collar-bone and shoulder raised, the abdomen being drawn in so as to push against the diaphragm, which is also raised. This action simply calls into requisition the upper or smallest portion of the lungs and consequently permits but a minimum amount of air to enter the lungs. Notwithstanding that this form of breathing requires the greatest expenditure of energy, it is com-

monly the only way of breathing with many people, especially among women.

Mid breathing, known as rib breathing and intercostal breathing, although superior to high breathing, is nevertheless inadequate. The abdomen is drawn in and the diaphragm pushed upward; the ribs are somewhat raised and there is a partial expansion of the chest. It is perhaps the most common form of breathing.

Low breathing is known under many different names, such as deep breathing, diaphragmatic breathing, etc., and has much to be said in its favor. It is in every sense superior to high breathing and mid breathing, yet cannot be termed as full or complete respiration. It fills the lower part of the lungs and a considerable portion of the middle part, but it does not fill the entire lung space.

Full or complete breathing embraces all the advantageous points of high, mid and low breathing without any of their objectionable features. The entire respiratory apparatus is brought into play and every air cell is reached. The complete respiratory system responds to this breathing, producing the maximum amount of benefit with a minimum expenditure of energy. The thoracic cavity is increased to its full limit in every direction, each part performing its natural function in a natural way. In no other form of breathing are all the respiratory muscles brought into play, but in complete breathing every respiratory muscle is used, the ribs are forced into useful activity and not only increase the space in which the lungs may be expanded, but give proper support at needed points. The diaphragm draws the ribs slightly downward, while other muscles hold them in place, and they are forced outward by the intercostal muscles. This increases the mid-chest cavity to its full natural capacity. The intercostal muscles also lift the upper ribs and force them outward, thereby increasing the upper chest capacity to its maximum.

It requires study and practice to acquire such mastery of complete breathing as will enable one to carry on the process as the natural method of breathing, but the results obtainable are so great and so beneficial that no one, once having become master of the art, will go back to the old method of breathing. The complete breath is not abnormal, but on the contrary the only natural way of breathing, and the healthy infant, even in civilization will usually be found to breathe in this way, but neglect in the care of children and unnatural methods of living, clothing, etc., result in unnatural forms of breathing. While the form of complete breathing

should be followed at all times it is not essential that the lungs should be completely filled at each inhalation.

Ordinarily the average amount of air taken in breathing is adequate, provided the complete form be followed, for in complete breathing, be the quantity inhaled large or small, it is evenly distributed to all parts of the lungs. But at least several times a day, and the more frequently the better, a series of complete breaths should be taken in such manner as to completely fill all parts of the lungs with fresh oxygen.

In a later part of this chapter will be found a complete series of exercises to be used in the development of different parts of the body, but the following exercise will give a clear idea of the manner of complete breathing:

Sit or stand erect. Breathe steadily through the nose in such manner as to fill the lower part of the lungs, to accomplish which the air must press upon the diaphragm so as to cause it to descend with gentle pressure upon the abdominal organs, forcing the front walls of the abdomen forward. Now fill the middle part of the lungs. This will push out the lower ribs, breast bone and chest. Now fill the higher portion of the lungs, forcing the upper chest outward and lifting the whole chest, including the upper pairs of ribs. In this last mentioned movement there will be a slight drawing in of the lower part of the abdomen, giving the lungs support and also aiding in the filling of the highest part of the lungs. Although these are described as if they were three separate movements, the whole operation is one continuous action, commencing at the lower diaphragm and gradually, but continuously, coming upward until the highest points of the lungs have been reached. Jerky inhalation should be avoided and a steady, continuous action strived for. At first there will be a tendency to divide the inhalation into three movements, but comparatively little practice will overcome this. Retain the breath a few seconds, then slowly exhale, the chest being held in a firm position, the abdomen being drawn slightly inward and slowly upward as the air leaves the lungs. Upon complete exhalation relax the chest and abdomen. It will require some practice to perform this exercise easily, but once mastered, the movement will be performed almost automatically.

This method of breathing brings into play all parts of the respiratory system, the most remote air cells being exercised and the chest cavity expanded in every direction. It will be found advantageous in beginning to practice this breath before a large mirror. Lightly place the hands upon the abdomen so that the movement may be felt. Watch the whole

chest movement in the mirror and endeavor to make the inhalation reach the different parts of the lungs in continuous, not spasmodic succession. While there should not be straining in taking the complete breath, it will be found well occasionally, at the end of an inhalation to slightly elevate the shoulders, which will raise the collar-bone and permit air to pass freely into the small upper lobe of the right lung, which is frequently a breeding place of tuberculosis.

It is believed that those who habitually utilize the form of complete breathing in their respirations will be immune to consumption and other pulmonary troubles, and that with those who have already contracted this wasting disease, it will do much in amelioration if it does not positively cure. Low vitality is a principal cause in consumption, and low vitality is largely attributable to an insufficient amount of air being inhaled, causing a considerable portion of the lungs to remain inactive, and these inactive parts become inviting fields for germs. If the lungs be in healthy condition they will resist germs and habitual complete breathing of pure air will keep the lungs in healthy condition. Consumptives are almost invariably narrow chested, which simply means that they have been addicted to improper methods of breathing, for those who have been accustomed to complete breathing will always be found with full, healthy chests. Those who are narrow chested may develop normal proportions by adopting the mode of breathing here prescribed.

Colds may frequently be prevented by a little vigorous breathing when it is felt that one is unduly exposed. If chilled, utilize the complete breath vigorously for a few minutes, when a glow will be felt over the whole body. It is claimed by some people that most colds may be quickly cured by complete breathing and partial fasting.

It has been shown how under-oxygenated blood (caused by improper breathing) becomes poor in quality, is laden with many impurities and carries disease instead of nourishment throughout the system. Every organ is dependent for nourishment upon the blood, and impure blood must have a detrimental effect upon the entire system. The stomach and other organs of nutrition cannot be properly nourished when there is improper breathing. Not only are these organs themselves ill-nourished, and therefore unable to properly perform their functions, but the food itself must absorb oxygen from the blood and thus itself be oxygenated before it can be digested and assimilated.

The nervous system also suffers from improper breathing because the brain, the spinal cord, the nerve centers and the nerves themselves depend

upon the blood for their nourishment, and when the blood is impure they become inefficient mediums for generating, storing and transmitting nerve currents.

EXERCISES IN FULL OR COMPLETE BREATHING.

Whatever may be considered of them otherwise, it is a recognized fact that the Yogis of Hindustan are practically without exception superbly physicaly developed. Their claim is that this physical development is due to complete breathing, which has been practiced by them and their forebears for many centuries. They have many exercises, some of which they claim produce mental and psychic conditions, but the following exercises are those most generally used by them for physical development:

Cleansing Breath.—This has for its object the ventilation and cleansing of the lungs. It is a common practice to conclude breathing exercises with this cleansing breath, the claim being that it cleanses and ventilates the lungs and generally refreshes the entire system, and that it is especially restful to speakers and singers who are tired from excessive use of the respiratory organs. (1) Inhale a full or complete breath and retain this for a few seconds. (2) Without swelling out the cheeks pucker up the lips as if about to whistle and then with considerable force exhale a small quantity of air through the opening. Now stop for a moment and then exhale a little more and again stop, and continue in this manner until the air is completely exhaled. Do not forget that each time the air must be forced from the mouth with considerable vigor. This cleansing breath will be found very refreshing when one is tired or exhausted. It should be practiced until its performance becomes natural and easy.

Nerve Vitalizing Breath.—The claim for this breath is that it is one of the strongest nerve stimulants possible to be used, developing nerve force, energy and vitality, and by working on important nerve centers stimulates and energizes the entire nervous system, sending increased nerve force to every part of the body. (1) Stand erect and inhale a complete breath and while retaining it extend the arms limply straight in front, using only sufficient nerve force to keep them in that position. (2) Draw the hands slowly back toward the shoulders, gradually putting nerve force into the muscles in such manner that when the fists reach the shoulders they will be so tightly clenched as to give the feeling of tremulous motion. (3) Keep the fists closed and the muscles tense and push the arms slowly outward to their full extent and then, still keeping them tense

Correct Position for Complete Breathing.

Filling the Upper Lobe of the Right Lung.

Nerve Vitalizing Breath.

Cleansing Breath.

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draw the fists quickly back to the shoulders. Repeat this several times. (4) Exhale vigorously through the mouth and then practice the cleansing breath. To secure full effect not only must the lungs be thoroughly filled, but special attention given to drawing back the arms with speed and in keeping the muscles in a highly tense state.

Vocal Breath.—The object of this breath is to develop the voice. It is claimed for it that it makes the voice soft and flexible, yet thoroughly resonant. (1) Take complete breath very slowly, but steadily, using utmost possible time in the inhalation. (2) Retain the air in the lungs for a few seconds and then vigorously expel it through the mouth with one strong, forceful breath. (3) Follow with a cleansing breath which will rest the lungs.

Retained Breath.—The object of this breath is to strengthen and develop the respiratory muscles and the lungs. It also has a tendency to expand the chest. It is claimed for it also that it is very beneficial to the organs of nutrition, the nervous system and the blood. The retention of the full breath has a purifying effect upon the air remaining in the lungs from former inhalations and not only so, but during its retention it gathers up all waste matter in the lungs and carries it out of the system when the breath is expelled, cleansing the lungs as thoroughly as a purgative does the bowels. It is recommended for various disorders of the stomach, liver and blood and is helpful in relieving bad breath when this is attributable to poorly ventilated lungs. (1) Stand erect and inhale a complete breath and retain it as long as it can comfortably be held. (2) Vigorously exhale the air through the open mouth and then practice the cleansing breath. In early efforts it will be found difficult to retain the breath for more than a very short time, but with constant practice this difficulty will be overcome. By timing yourself with your watch you will be able to note steady progress.

Lung Cell Stimulation.—This breath is intended to stimulate the air cells of the lungs. Beginners must be very careful not to overdo it, and under no circumstances should it be practiced vigorously. It sometimes causes slight dizziness with beginners. In such cases the exercise should be discontinued for some time. To relieve the dizziness take a short walk. (1) Standing erect with hands at sides slowly and gradually take a complete breath and while inhaling raise the arms and with the finger-tips gently tap the chest at different points. (2) The lungs being filled, retain the breath, at the same time patting the chest with the palms of the hands. Then practice the cleansing breath. With those who have been

accustomed to imperfect breathing for years, many air cells will be found inactive, sometimes almost atrophied, and it will take considerable time and careful practice to revive them to activity, but regular and continued practice of deep breathing and the careful daily use of this exercise will have most beneficial effect.

Rib Stretching.—Owing to the cartilages with which they are fastened the ribs are subject to considerable expansion, and in proper breathing play an important part in respiration. It is therefore well to give them special exercise in order that their elasticity may be preserved. With people of sedentary habits the ribs are likely to become more or less stiff and inelastic, and in order to enjoy the full benefits of complete breathing this unnatural condition should be overcome. (1) Standing erect, place the thumbs close under the armpits with the palms on the side of the chest and the fingers over the breast. (2) Inhale a complete breath and retain it for a short time. Then slowly exhale, gently squeezing the sides with the hands while doing so. Follow with the cleansing breath. This exercise should be used with moderation.

Chest Expansion.—The object of this exercise is to restore natural chest expansion when the chest has become contracted from bending over work or other cause. (1) Stand erect and inhale a complete breath. Retain the air and while doing so extend both arms forward, bringing the two clenched fists together on a level with the shoulders. (2) Swing the fists vigorously until the arms are sideways in line with the shoulders. Then bring the arms back to their position in front of the body and repeat this movement several times. (3) Vigorously exhale through the open mouth and practice the cleansing breath. This exercise must be used with moderation and with caution.

Walking Exercise.—This exercise will not only be found generally helpful, but it is an excellent method of practicing the complete breath. One should walk in military style—that is, with head erect, chin drawn slightly in and shoulders back, the pace being measured. (1) While walking, inhale a complete breath, mentally counting each step and making the inhalation extend over eight counts. (2) Still counting the steps, slowly exhale through the nostrils through the counting of eight more steps. (3) Continue walking and counting, but do not breathe until another eight steps have been taken, then repeat the inhalation and exhalation in the same manner and with the same counting. This may be kept up until there is a feeling of being tired, when it should be discontinued and resumed at pleasure. This exercise should be practiced

INSTRUCTOR.

PUPIL.

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Lesson A. Position 1.—This shows how the footpad comes up on your right side and grasps the lapel of your coat, putting you at his mercy.

Lesson A. Position 2.—Always carry an awl, and, as shown, jab him in under side of arm with all the force at your command.

Lesson B. Position 1.—Should a person point a revolver at you, ordering you to hold up your hands, comply with his request.

Lesson B. Position 2.—By throwing them up with great force, your clenched fist striking the under side of gun wrist as shown in illustration.

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Lesson C.—Should you fear bodily harm and wish to subdue your opponent, bring your hand up with great force, crotching the nose between fore and middle finger.

Lesson D. Position 1.—Grasp your adversary by the left hand.

Lesson D. Position 2.—Raise the left arm, turning his wrist inward with your left; slide your right under his left.

Lesson D. Position 3.—Grasp the lapel of his coat and stiffen your right arm, pushing your opponent's left from you until it rests on your right forearm; at the same time twist his left wrist toward you and bear down. Partial paralysis of the nerves results.

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Lesson E. Position 1.—Grasp your adversary's left hand at the wrist and raise it inwardly, using your right to push his elbow forward.

Lesson E. Position 2.—This will turn his back toward you. Draw his left arm up, twisting the wrist. Take a firm hold of his coat collar.

Lesson F. Position 1.—Grasp your opponent's left hand at the wrist with your left and raise it inwardly, using your right to push his elbow forward.

Lesson F. Position 2.—Draw his left arm up, twisting the wrist. Take a firm hold of his chin and twist his head backwards.

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Lesson G. Position 1.—Grasp your opponent's hand and raise it, pressing on knuckles as shown above.

Lesson G. Position 2.—Press your opponent's hand backward with your thumb and at the same time twist his hand to the right.

Lesson H. Position 1.—Grasp your adversary firmly by the lapels of his coat, pulling him toward you.

Lesson H. Position 2.—Step quickly to right, placing your left leg behind his left. Throw him by pushing backward and to the right.

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Lesson I. Position 1.—Grasp your opponent's right hand with your left, so that your fingers rest in the palm of his hand and your thumb on the back, close to the wrist.

Lesson I. Position 2.—Raise his arm quickly over your head and go under, at the same time striking him in the solar plexus.

Lesson I. Position 3.—You now have his right arm twisted so that he is helpless.

Lesson J. Position 1.—Seize your opponent's right wrist with your left hand.

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Lesson J. Position 2.—Twist his arm to the left and raise it, going under.

Lesson J. Position 3.—With your right hand grasp your adversary's throat and pull downward with your left. You may choke your victim or break his arm.

Lesson K. Position 1.—Take a firm hold with both hands so that your thumbs will rest on the back of your opponent's hand.

Lesson K. Position 2.—Press the hand back with your thumbs, at the same time twisting to the left and downward.

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Lesson L. Position 1.—Step to your adversary's left, taking hold with both hands, and raise his arm.

Lesson L. Position 2.—Press inward and twist to the right. Always keep his arm raised.

Lesson M. Position 1.—Should a thief reach to steal your diamond pin or diamond stud, use your left hand, placing your three first fingers on his hand, forcing his arm to the left.

Lesson M. Position 2.—Quickly take two steps to the right and force his arm upward.

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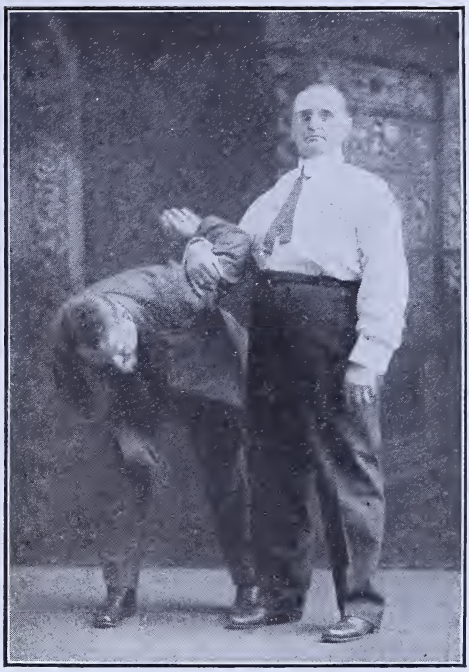
Lesson N. Position 1.—Place your right arm through your opponent's left. Step to the right and inward, raising his arm.



Lesson N. Position 2.—He will be forced to bend over, as his arm is locked.

Lesson O. Position 1.—Seize your adversary's left wrist with your left hand. Force his hand up, twisting to the left. Have your right ready to

Lesson O. Position 2.—Take hold of his left. You can now twist his arm at will.

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Lesson P. Position 1.—Grasp your opponent's left hand with your left, the ball of your hand resting in his palm. Twist his arm to the right, raising it over your head.

Lesson P. Position 2.—Go under, grasping his right arm with your right hand, and pull down with your left.

Lesson Q. Position 1.—Should a person grasp your lapels with the intention of doing you bodily harm, force your arms up between his, stepping forward.

Lesson Q. Position 2.—Bring your left arm outside and under your opponent's right, placing your right hand on his shoulder and holding the left hand on the right arm.

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Lesson R. Position 1.—Grasp your opponent's left hand with your right, allowing your thumb to rest on the back of his hand and the fingers on the palm.

Lesson R. Position 2.—Raise his hand up, pressing firmly with your right thumb and use your right as shown above.

Lesson S. Position 1.—Grasp your adversary's left hand with your left, so that the ball of your hand will rest on his.

Lesson S. Position 2.—Quickly bring your right hand around his left arm and press down with the left, at the same time twisting his wrist.

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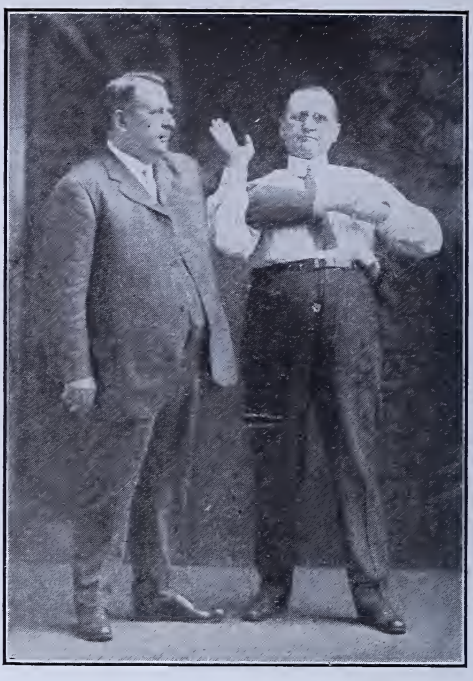
Lesson T. Position 1.—Seize your opponent's left hand with your left, the ball of your hand resting on the back of his.



Lesson T. Position 2.—Raise his arm, twisting inward. Place your right arm under his left.

Lesson T. Position 3.—Place the right at the back of his head.

Lession T. Position 4.—Press his arm down with your left, twisting inwardly, and force his head down with your right.

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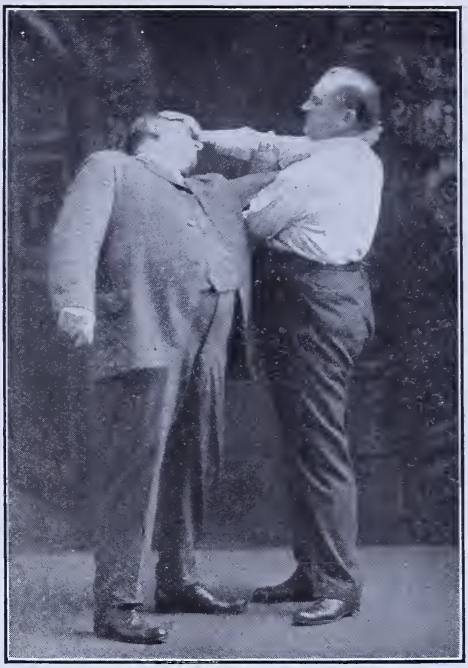
Lesson U. Position 1.—Grasp your opponent's left hand with your right, your thumb resting on the back and your fingers on the palm of his hand. Hold firmly with left and pass right under his arm.



Lesson U. Position 2.—Grasp your right arm with your left hand and press upward. Seize his head with your right hand and twist.

Lesson V. Position 1.—Should a person point a revolver in your face quickly seize his wrist with both hands, raising his arm, and twist to the right.

Lesson V. Position 2.—With your right hand. You can then take the revolver with your left or force him to drop it.

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Lesson W. Position 1.—If a person grasps you by the throat, seize his index finger with your left hand, draw his hand up and to the left.

Lesson W. Position 2.—Run your right under his left arm.

Lesson W. Position 3.—And grasp his right wrist, pressing down firmly.

Lesson W.—Showing friendly feeling existing between instructor and pupil, notwithstanding nervous tension to which pupil has been subjected.

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several times every day. Some people find it advantageous to retain the breath during a count of four steps, then exhaling in an eight step count as described.

Morning Exercise.—Standing erect with head up, chin in, shoulders back, eyes front, hands at sides and knees stiff, raise the body slowly on the toes and while doing so steadily and slowly inhale a complete breath. Retain both breath and position for a few seconds and then slowly sink back to the first position, slowly exhaling through the nostrils while doing so. Repeat the exercise several times, varying it by standing on right leg alone and then on left leg alone. Follow with the cleansing breath.

Stimulating Circulation.—The object of this exercise is to stimulate the circulation by driving blood to the extremities through the arteries and drawing it back to the heart and lungs through the veins in order that the blood may receive an extra charge of oxygen through the quickened circulation. In cases of anæmia and poor circulation there may not be enough blood in the lungs to absorb the increased amount of oxygen inhaled in complete breathing, and such persons therefore do not enjoy the full benefits of complete breathing. The occasional practicing of this exercise with the regular complete breathing will aid in bringing about an absorption and assimilation of the increased oxygen. (1) Place a cane or stick on a low table, and standing erect in front of it, inhale and retain a complete breath, and while retaining bend slightly forward and firmly grasp the stick and gradually exert your full strength upon the grasp. Then relax the grasp and return to the first position, when slowly exhale. Repeat several times and follow with the cleansing breath.

Rhythmic Breathing.—It is well known that there is great power in rhythm. A note on a violin sounded repeatedly and in rhythm will start vibrations which, if properly directed, would move ponderous bodies. When moving in body soldiers are supposed to keep step, but when crossing a bridge they invariably break the general body step, each soldier walking without regard to the stepping of the man around him, and the whole body thus marching without uniformity or rhythm. If this were not done the steady, rhythmic tramp of thousands of soldiers would set up such vibration that the bridge would collapse. Rhythmic breathing acts in this same way upon the human body and if it be brought into full rhythmic harmony with the will it can be directed to increase nerve currents to different parts of the body by the will. It is first necessary to be thoroughly and practically familiar with and habitually accustomed to complete breathing, after which the full mental idea of rhythm must be

acquired. The measured counting in music: one, two, three, four; one, two, three, four, or the rhythmic step of the soldier: left, right; left, right, are symbolical of the idea. In breathing the rhythm must be with the heart-beat and as the heart-beat varies in different persons, the heart-beat unit of each individual must be his or her rhythmic standard. The heart-beat may be ascertained by placing a finger over the pulse on the wrist and counting: one, two, three, four, five, six; one, two, three, four, five, six, and continuing this until the measure or rhythm of the beats becomes thoroughly fixed in the mind. Very little practice will so positively fix this rhythm in the mind that there need be no actual counting in making the breathing correspond to the heart-beat. The average beginner inhales in about six pulse units, but in some cases it may run to seven or eight, and these numbers with practice will gradually increase. The exact counting to a measure must depend upon the individual and must be decided by himself, but the idea is the same whether the measure or rhythm be covered by four or eight pulse units. The rhythmic units of inhalation and exhalation are the same, but the units for retention and the units between breaths should be one-half those of inhalation and exhalation—that is to say, if the rhythmic inhalation be eight pulse beats, the rhythmic retention will be four beats, the rhymic exhalation eight beats, and the rest until the next inhalation four beats.

The Hindu Yogis claim wonderful psychic effects as possible with a full knowledge of rhythmic breathing, but without taking up this phase of the matter, which is foreign to our present discussion, and considering rhythmic breathing simply as respects its relation to the physical effects of complete breathing, the following exercise will be demonstrative of rhythmic effect: (1) Sitting erect, but in an easy position, yet with the chest, neck and head as nearly as possible in line, shoulders slightly thrown back and hands quietly reposing on the lap, slowly inhale a complete breath, counting six pulse units. (2) Retain this breath while counting three pulse units. (3) Exhale slowly through the nostrils during the time of six pulse units. (4) Count three pulse units and then again inhale. Repeat this a number of times, but be careful not to do so to a point of fatigue. When you feel that the exercise has been sufficiently prolonged follow with the cleansing breath, which will not only rest you, but cleanse the lungs. Gradually with practice, the duration of the inhalations and exhalations will increase until perhaps fifteen pulse units indicate a measure or rhythm and it is to be remembered that he units for retention and between the breaths increase in like proportion—that is, they

continue to be one-half of the units of inhalation and exhalation. Always avoid becoming tired in this exercise. Practice it frequently, but in no instance excessively continue any one exercise, but on each occasion pay all possible attention to acquiring the "rhythm," until the measured swing of the rhythm may be felt as a vibratory motion throughout the whole body. It will require time and much perseverance to accomplish this, but the gratification that will come as improvement is observed will make the task a pleasing one.

SEVEN SIMPLE EXERCISES IN COMPLETE BREATHING.

Being a Condensed Course in Physical Culture and Lung Development.

1. Standing erect, with hands at sides, inhale a complete breath and retain it, raising the arms rigidly until they meet above the head; hold them there a moment and then lower the hands slowly to the sides, exhaling slowly at the same time. Follow with the cleansing breath.

2. Standing erect with arms straight in front, inhale and retain a complete breath. Then swing the arms back as far as they will go, and still retaining the breath, bring them forward to the first position and repeat the whole movement several times without any exhalation. Then exhale vigorously through the mouth and follow with the cleansing breath.

3. Standing erect with arms straight in front of you, inhale complete breath; swing the arms around a few times in a backward circle, then reverse the motion. The breath must be retained throughout all the motions. Then exhale vigorously through the mouth and follow with the cleansing breath.

4. Lying face downward on the floor with palms of hands flat upon the floor at the sides, inhale and retain complete breath. Then stiffen the body and raise it by the strength of the arms until the whole weight is upon the hands and toes. Then lower the body to its original position and exhale vigorously through the mouth. Follow with the cleansing breath.

5. Standing erect with your palms against the wall, inhale and retain a complete breath, then with the weight of the body on the hands push the chest forward against the wall; then, keeping the body still and using only the arm muscles push the body back to the original position; then exhale vigorously through the mouth and follow with the cleansing breath.

6. Standing erect with the hands resting on the waist and the arms akimbo, inhale and retain a complete breath; then keeping the hips and legs stiff, bend well forward, slowly exhaling as the forward movement is

made. Returning to the first position inhale again and then bend backward, slowing exhaling; resuming the first position and inhaling, bend to one side, exhaling, and then repeat by bending to the other side. Follow with the cleansing breath.

7. Standing or sitting erect with straight back, inhale a complete breath, not in the usual continuous manner, but instead in a series of short quick breaths, adding one breath to the other without exhaling until the lung space is completely filled. After retaining this series of breaths for a few seconds, exhale through the nostrils in one long restful exhalation. Follow with the cleansing breath.

The exercises which have been given are useful to all people of whichever sex. They may be brought into utilization in youth or old age, but they should be put into effect from early infancy. The mother should carefully guard all points of breathing. She should see that the child from its earliest days does not breathe through the mouth, she should take every precaution and use every endeavor to bring about breathing through the nostrils. As the child grow older and commences its infantile frolics this point still should be guarded and at a very early age instructions should be commenced as to the proper form of breathing. Very simple demonstrations will appeal to the little child in a way that will bring effects that could not be accomplished in later years. The great point is to make it become natural with the child from its earliest beginnings to breathe in the right way, so that it will not need to be a lesson to be learned, but something that is naturally done. It is not advocated that the whole series of breathing exercises set forth in this chapter should be taught, but that the natural art or system of nature as it exists and is demonstrated by complete breathing should be instilled into the child in its early, plastic age, so that there may be no thought nor effort in later years as to how or why this particular form of breathing should be performed, but that it comes as a natural part of existence.

There is one point in connection with complete breathing which must not be lost sight of, and it is this—there should be no straining of the lungs nor muscles in endeavors to carry out the exercises which have been outlined. This is to be especially noted in respect of those whose lungs are weak and still more especially when there has been indication of hemorrhage. Where tendency to hemorrhage exists it is evident that the minute blood-vessels of the lungs have become deteriorated and are susceptible to strain of any kind and should complete breathing be exercised with straining effort it follows that there must be danger of rupture of

the vesicles and hemorrhage may ensue. This does not mean to say that complete breathing should not be adopted by people with weak lungs, but simply that there should be no undue straining. With one whose lungs are strong and in healthy condition, vigorous and even strained effort may be employed, but with those whose lungs are weak it must be matter of quietly endeavoring to reach the extremities of the lungs to an extent that never before has been reached, yet without strain. In other words, do not attempt to completely fill each and every cell of the lungs by strenuous effort, but quietly reach the entrance to all the cells by the complete breath inhaled and exhaled without undue effort, and gradually these entrance cells will open the way to the deeper parts and permit the entry of oxygen or life-giving source to cells which have become dormant.

REMEDIAL EXERCISES

By Remedial Exercises, we mean particularly a scientific series of movements bringing into play and developing those muscles that hold, encase or control, the great vital organs: the heart, lungs, kidneys, liver, intestines and female organs of generation.

These exercises have proven beneficial to an extraordinary degree, as they increase bodily vigor, and help all organs to perform their functions properly. They are suggested as a *natural method* of treatment in certain common disorders.

We hold that prevention as a successful factor in the attainment of health is not possible under certain conditions. The arm with weakened muscles could not prevent or ward off a blow. That entire organ that has dropped out of normal place, because the supporting muscles are not strong enough to hold it properly, cannot perform its functions and prevent or ward off disease.

While the exponent of the *natural method* seeks no quarrel with the drug practitioner, yet he believes that there are many cases where the use of drugs cannot possibly benefit, and is more than likely to prove very harmful.

The muscles of the weakened arm need to be exercised properly—

soon the blood courses through each artery and vein, waste and diseased tissue is carried away, while the nascent oxygen and blood corpuscles repair everything that need attention.

In like manner, the muscles and supporting tissue sorrounding the internal organs can be strengthened, and the organs brought to a normal condition. Now, their corrected action quickly brings about perfect health. While the masseur, chiropractic and the osteopath obtain some excellent results along these lines by purely mechanical methods, the results are more beneficial and permanent when the muscles are worked naturally instead of artificially.

The following are selected as a thorough series of Remedial Exercises; any one of which, if persisted in regularly over a reasonable period of time, will bring results.

Care should be taken at the start not to exercise too hard. For the first few days merely go through the motions and become accustomed to what you are doing, and why. Put your mind thoroughly on each movement, as exercise of a certain amount of your will power is helpful in any method of treatment, but particularly so in this method, where the object is to build up and strengthen all important organs naturally from within. Centering the mind on the organ to be benefited directs the blood to that place.

FIRST EXERCISE (For Men and Women).

Object.—To tone up and strengthen heart, lungs, stomach, spleen, liver and intestines.

Place the hands, closed, on chest with knuckles touching the elbows raised until forearms are horizontal. Completely fill the lungs, then close throat as if swallowing; holding the throat closed, lower chest and force air fully into the lower lungs by distending the abdomen. Still holding throat closed, contract abdomen and inhale in upper lungs, spreading chest as fully as possible. Be careful to hold the throat closed, not allowing air to escape while distending abdomen and chest. Repeat five to ten times. Relax chest and exhale slowly.

SECOND EXERCISE (For Women).

Object.—To strengthen kidneys and ovaries.

Lie on floor or bed; clasp hands over head. Stretch downward with

right leg, reaching far as possible with the leg, until the right hip is drawn so that a line from the armpit to the hip is straight. Center your thought on the muscles of the hips and buttocks. While holding right hip and leg tense, reach up with the left hip, drawing same as high as possible. The left hip bone in this exercise may be brought as much as four inches higher than the right. Change, stretching left and raising right hip. Repeat twenty times, alternating ten times with each hip.

THIRD EXERCISE (For Women).

OBJECT.—To bring weakened organs back to normal strength and proper position in the body. Beneficial in kidney trouble, ovarian disorders and prolapsus of the uterus.

Lie on the back with hands folded under the head. Bend knees, bringing feet close to body. Raise heels, supporting body on head and shoulders, and raise thighs slowly until body curves upward from knees to neck. Now draw feet still closer and contract muscles of abdomen, hips and back, making them rigid. Lower body nearly to floor and raise again while keeping abdominal muscles tense. Raise and lower five times; rest; repeat five times.

FOURTH EXERCISE (For Men and Women).

OBJECT.—To check and prevent cold, catarrh, hay fever, asthma, bronchitis and similar ailments.

Lie on back with arms and legs relaxed. (1) Distend muscles of the abdomen; relax. Repeat five times. (2) Distend muscles over stomach; relax. Repeat five times. (3) Lift chest upward, trying to make it touch chin, but do not raise small of back too far from floor. The abdomen in this movement draws in tensely. Now relax chest. Repeat five times. Distend and relax as in (1); follow directly with (2). Continue this movement to (3), abdomen tense. This creates a surging movement affecting many important muscles. Repeat the movement five times. Take every night on retiring; follow by ten deep full strong breaths.

FIFTH EXERCISE (For Men and Women).

OBJECT.—To correct catarrhal condition of the nose and throat.

Distend muscles over diaphragm with strong, quick movement. This

is done by keeping mouth closed, inhaling quickly through the nostrils, which will close quickly as the muscles contract. This exercise should be done vigorously, and will cause a loud sniffling sound, both in inhaling and exhaling. Distend muscles to the fullest extent, contracting quickly and repeating in rapid succession ten times.

BOOK XIX

Treats of Jiu-Jitsu, the great Japanese system of self-defense.

Adam's Apple Blow.....1711
Constipation, Jiu-Jitsu for 1710
Death-producing Grips and Blows....1710
Dyspepsia, Jiu-Jitsu for 1710
Breathing in Jiu-Jitsu 1710
Indigestion, Jiu-Jitsu for 1710
Insomnia, Jiu-Jitsu for 1710
Jiu-Jitsu 1709
Jiu-Jitsu as Functional Structure .1710
Deep Breathing in 1710
Effect of on Muscles 1710
History of 1709
Varieties of 1710
Obesity, Jiu-Jitsu a cure for 1711
Pulmonary Troubles, Jiu-Jitsu for...1710
Self-Defense, Japanese System of....1709

ILLUSTRATIONS

Twenty-four Exercises in Jiu-Jitsu, illustrated by fifty-four photographs, with a full explanation of each photograph

Book XIX

JIU-JITSU

JAPANESE SYSTEM OF SELF-DEFENSE

Jiu-Jitsu, the much-talked of Japanese system of self-defense, has attracted so much attention throughout the English-speaking countries of the world that its acceptance in this country as a meritorious branch of combative athletics causes not the slightest surprise among broad-minded people.

Like all innovations, especially foreign ones, Jiu-Jitsu was at first disparaged by scores of people. Some of them still hold to their original opinion, but many, who have made a thorough study of the subject, have found that the science contains much of value.

Jiu-Jitsu is the most wonderful system of physical training the world has ever known. It is a science. It is muscle dominated and directed in every detail by the brain.

Jiu-Jitsu is one of the oldest known branches of self-defense. Authentic records of its existence before the Christian era are now in possession of the Mikado of Japan. History relates that so far back as 200 years before Christ the supporters of the Japanese emperor of that time fought unarmed against hostile tribes, and, aided by Jiu-Jitsu, completely defeated them. The tribes in question carried the arms of the day, but this availed them nothing against the disconcerting and often deadly tricks of the Jiu-Jitsu experts.

A large proportion of the tricks temporarily paralyze nerves and nerve-centers, and others stop the circulation of the blood in various parts of the body. Many holds consist of twisting the hand, arm, leg, ankle or the neck, and many more depend for success on the obtaining of powerful leverage on the arm or leg on various joints. There are some Jiu-Jitsu manœuvres which have never been explained to Europeans or Americans and probably never will be. Especially reticent are the Jap-

anese regarding the dozen or so of death-producing grips and blows. Several of them have been described in detail by them at various times, but others are only hinted at. These blows are remarkable. Jiu-Jitsu experts execute a trick which is very much like the boxer's solar plexus punch. It consists of a blow delivered violently into the solar plexus and twisted in a peculiar manner, completely paralyzing this nerve center. The blow also produces breathlessness, and, in cases of poorly trained men, nausea.

Jiu-Jitsu comprises three different systems or branches and upwards of 250 manœuvres. One branch, the most common, calls for the use of the hands only, another, a piece of rope, and the third, a club. However, only the first named is considered here, for it is the one most frequently used. Japanese experts are, of course, proficient in all three branches. The Japanese are the hardiest race of people in the world today, and they attribute their wonderful strength and power of endurance to the persistent practice of their national system of physical development. Jiu-Jitsu develops every muscle and strengthens every organ in the human body. It affects the minute muscles which are not reached by any other system. It strengthens the heart action, renews and invigorates every tissue, and helps every organ to properly perform its functions. The man or woman who will devote ten minutes daily to the practice of Jiu-Jitsu will enjoy a degree of health and strength that will make him or her thoroughly alive and fully conscious of the possession of perfect manhood or womanhood. As a system of physical culture Jiu-Jitsu is superior to most methods. It results in a very fine all-round development, and the peculiarity of the Japanese system is that the muscles never become hard like those of an ordinary athlete, but remain perfectly soft and pliable to the touch and are apparently coated with a layer of fat as the muscles of the Greek athletes were said to have been in the days of the Olympian Games.

The exertion of pressure on muscles and ligaments is the idea of Jiu-Jitsu, and a thorough knowledge of the parts of the human body thus vulnerable is essential to expert practice of the system. On the strength of the stomach a great deal depends. Next in importance is the training of the heart and lungs by deep breathing, with which every lesson in Jiu-Jitsu begins and ends. Fresh air is, of course, an absolute necessity.

Jiu-Jitsu is also a natural and positive cure for constipation, indigestion and all other forms of dyspepsia, insomnia, pulmonary troubles and lack of vitality. Its practice improves the appetite, accelerates cir-

culation and aids digestion. To the increased vigor and tone of the system the brain responds, and the mental capacity, as well as the physical is improved. The Japanese enjoy better health than any other nationality. With them consumption is very rare; the word dyspepsia has no meaning, and physical weakness is an affliction with which only the aged are beset. Extreme leanness is regarded by them much the same as Americans regard physical deformity and extreme corpulency is unknown. There is a reason for all this and it is found in Jiu-Jitsu.

Owing to the wide-spread eagerness for information regarding Jiu-Jitsu, many erroneous ideas have been formed regarding it.

Scores of holds and tricks purporting to be Jiu-Jitsu manœuvres have been exploited, but here are illustrated only such holds, etc., as are included in Jiu-Jitsu, omitting unauthoritative holds and those not considered practical. The so-called "Adam's apple blow" is one which is omitted, simply because in its execution the victim has one hand free, which a clever man would use in effectually blocking the movement.

The secret of Jiu-Jitsu consists in the knowledge of how to grasp an opponent in such a manner that he must either submit to be thrown or have the limb which is grasped ruthlessly broken. An expert Jiu-Jitsu wrestler can throw his adversary in practically any direction he wishes. In explaining and illustrating Jiu-Jitsu we have endeavored to give briefly the most important points of this valuable science.

Book XX

DICTIONARY OF DRUGS

Latin	English
Absinthium	Absinthium
Acacia	Acacia (Gum-arabic)
Aceta	Vinegars
Acetanilidum	Acetanilide
Acetum	Br. Vinegar
Acetum opii	Vinegar of opium
Acetum scillæ	Vinegar of squill
Acidum aceticum	Acetic acid
Acidum arseniosum	Arsenious acid
Acidum benzoicum	Benzoic acid
Acidum boricum	Boric acid
Acidum carbolicum	Carbolic acid
Acidum chromicum	Chromic acid
Acidum citricum	Citric acid
Acidum gallicum	Gallic acid
Acidum hydrobromicum dilutum	Diluted hydrobromic acid
Acidum hydrochloricum	Hydrochloric acid
Acidum hydrocyanicum dilutum	Diluted hydrocyanic acid. Prussic acid
Acidum lacticum	Lactic acid
Acidum nitricum	Nitric Acid
Acidum nitro-hydrochloricum	Nitro-hydrochloric acid
Acidum oleicum	Oleic acid
Acidum oxalicum	Oxalic acid
Acidum phosphoricum	Phosphoric acid
Acidum salicylicum	Salicylic acid
Acidum sulphuricum	Sulphuric acid
Acidum sulphurosum	Sulphurous acid
Acidum tannicum	Tannic acid
Acidum tartaricum	Tartaric acid
Aconitina	Aconitine
Aconiti folia	Aconite leaves
Aconitum	Aconite
Adeps	Lard
Adeps lana hydrosus	Lanoline
Aether	Ether
Alcohol	Alcohol
Allium	Garlic
Aloe	Aloes
Aloe barbadensis	Barbadoes aloes
Aloin	Aloin
Althæa	Althæa, marshmallow
Alumen	Alum
Aluminii sulphas	Sulphate of aluminum
Ammoniacum	Ammoniac
Ammonii benzoas	Benzoate of ammonium
Ammonii bromidum	Bromide of ammonium
Ammonii carbonas	Carbonate of ammonium
Ammonii chloridum	Chloride of ammonium
Ammonii iodidum	Iodide of ammonium
Ammonii nitras	Nitrate of ammonium
Ammonii phosphas	Phosphate of ammonium
Ammonii sulphas	Sulphate of ammonium
Ammonii valerianas	Valerianate of ammonium
Amygdala amara	Bitter almond
Amygdala dulcis	Sweet almond
Amyl nitris	Nitrite of amyl
Amylum	Starch
Amylum iodatum	Iodized starch
Anisum	Anise
Anthemis	Anthemis chamomile
Antimonium	Antimony
Antimonii et potassii tartras	Tartar emetic. Tartrate of antimony and potassium
Apocynum	Apocynum. Canadian Hemp
Apomorphinæ hydrochloras	Hydrochlorate of apomorphine
Aqua	Water
Aqua chlori	Chlorine water
Aqua auranti flor.	Orange flower water
Aqua ammoniæ	Hartshorn
Aqua calcis	Lime water
Argentum	Silver
Argenti nitras	Nitrate of silver

Latin	English
Aristolochia serpentaria	Snakeroot
Armoraceæ radix	Horse-radish root
Arnicæ flores	Arnica flowers
Arnicæ radix	Arnica root
Arsenium	Arsenic
Asafœtida	Asafetida
Asclepias	Asclepias (Pleurisy Root)
Aspidium	Aspidium (Male fern)
Aspidosperma	Quebracho
Atropa belladonna	Deadly nightshade
Aurantii amara	Bitter orange
Auranti cortex	Orange peel
Aurantii dulcis	Sweet orange
Auri et sodii chloridum	Chloride of gold and sodium
Avenæ farina	Oatmeal
Avena sativa	Oats
Balsamum peruvianum	Balsam Peru
Balsamum tolutanum	Balsam Tolu
Barium	Barium
Berbinæ sulphas	Sulphate of berbine
Belladonnæ folia	Belladonna leaves
Belladonnæ radix	Belladonna root
Benzinum	Benzine
Benzoinum	Benzoin
Bismuthi citras	Citrate of bismuth
Bismuthi et ammonii citras	Citrate of bismuth and ammonium
Bismuthum	Bismuth
Bromum	Bromine
Bryonia	Bryonia (Bryony)
Buchu	Buchu
Butyrum	Butter
Caffea	Coffee
Caffeina	Caffeine
Calamina præparata	Prepared calamine
Calamus	Calamus (sweet flag)
Calcis chloridum	Chloride of lime
Calcium carbonas precip.	Precipitate of chalk
Calendula	Calendula (Marigold)
Calumba	Calumba (Columbo)
Calx	Lime
Cambogia	Gamboge
Camphora	Camphor
Cannabis	Hemp
Cantharis	Cantharides (Spanish flies)
Capsicum	Capsicum
Carbo	Carbon
Carbo animalis	Animal charcoal
Carbo ligni	Charcoal
Cardamomum	Cardamomum
Carum	Caraway
Caryophyllus	Cloves
Cascarilla	Cascarilla
Cassia fistula	Cassia (Senna)
Castanea	Chestnut
Cataplasmata	Cataplasms
Catechu	Catechu

Latin	English
Caulophyllum	Blue cohosh
Cephælis ipecacuanha	Ipecac
Cera alba	White wax
Cera flava	Yellow wax
Cerata	Cerates
Cerevisiæ fermentum	Bur yeast
Cerii oxalas	Oxalate of Cerium
Cetaceum	Spermaceti
Cetraria	Iceland moss
Chelidonium	Celandine
Chenopodium	American wormseed
Chimaphila	Pipsissewa
Chinoidinum	Chinoidin (Quinoidin)
Chloral	Chloral (Hydrate of chloral)
Chloroformi	Chloroform
Chondrus	Irish moss
Chrysarobinum	Chrysarobin
Cimicifuga	Black snakeroot
Cinchona	Peruvian bark
Cinchonina	Cinchonine (Cinchonia)
Cinnamomum	Cinnamon
Cocainæ hydrochloras	Hydrochlorate of cocaine
Coccus	Cochineal
Codeina	Codeine (Codeia)
Colchisi radix	Colchicum root
Colchisi semen	Colchicum seed
Collodium	Collodion
Colocynthis	Colocynth
Conium	Hemlock
Convolvulus jalapa	Jalap
Copaiba	Copaiba (Balsam of Copaiba)
Coriandrum	Coriander
Cornus	Dogwood
Creosotum	Creosote
Creta	Chalk
Crocus	Saffron
Cubeba	Cubebs
Cuprum	Copper
Cupri sulphas	Bluestone
Cydonium	Quince seed
Cypripedium	Ladies' slipper
Datura stramonium	Thorn apple
Digitalis	Foxglove
Dulcamara	Bitter sweet
Elaterinum	Elaterin
Elaterium	Elaterium
Ergota	Ergot (Ergot of rye)
Erythroxylon	Coca
Eucalyptus	Eucalyptus
Euonymus	Wahoo
Eupatorium	Thoroughwort (Boneset)
Farina tritici	Wheaten flour
Fel bovis	Ox gall
Ferri citras	Citrate of iron
Ferri et quinia citras	Citrate of iron and quinine

LATIN	ENGLISH
Ferri ferrocyanuretum	Prussian blue
Ferri sulphas	Green vitriol
Ferrum	Iron
Ficus	Fig
Foeniculum	Fennel
Frangula	Buckthorn
Galbanum	Galbanum
Galla	Nutgall (Galls)
Gaultheria	Wintergreen
Gelsemium	Yellow jasmine
Gentiana	Gentian
Geranium	Cranesbill
Glycerinum	Glycerin
Glycyrrhiza	Liquorice root
Gossypii radicis cortex	Cotton root bark
Gossypium	Cotton (Purified cotton. Absorbent cotton)
Granatum	Pomegranate
Grindelia robusta	Grindelia
Guaiaci lignum	Guaiacum wood
Guaiaci resina	Guaiac
Guarana	Guarana
Gutta-percha	Gutta percha
Hæmatoxylon	Logwood
Hamamelis	Witchhazel
Hedeoma	Pennyroyal
Hordium decorticatum	Pearl barley
Humulus	Hops
Hydrargyri chloridum corrosivum	Corrosive chloride of mercury (Corrosive sublimate. Mercuric chloride)
Hydrargyri chloridum mite	Mild chloride of mercury (Calomel. Mercurous chloride)
Hydrargyri cyanidum	Cyanide of mercury
Hydrargyri iodidum rubrum	Red iodide of mercury
Hydrargyri iodidum viride	Green iodide of mercury
Hydrargyri oxidum flavum	Yellow oxide of mercury
Hydrargyri oxidum rubrum	Red oxide of mercury
Hydrargyri persulphas	Persulphate of mercury
Hydrargyri subsulphas flavus	Yellow subsulphate of mercury
Hydrargyri sulphidum rubrum	Red sulphide of mercury
Hydrargyrum	Mercury (quicksilver
Hydrargyrum ammoniatum	Ammoniated mercury White precipitate
	Mercurammonium chloride
Hydrargyrum cum creta	Mercury with chalk
Hydrastis	Golden seal
Hyoscyamus	Henbane

LATIN	ENGLISH
Ichthyocolla	Isinglass
Ignatia	Bean of St. Ignatius
Illicium	Star anise
Inula	Elicampane
Iodoformum	**Iodoform**
Iodum	Iodine
Ipicacuanha	Ipecac
Iris	Blue flag
Jalapa	Jalap
Juglaus	Butternut
Juniperus	Juniper
Kamala	Kamala
Kino	Kino
Krameria	**Rhatany**
Lac	Milk
Lactuca	Lettuce
Lactucarium	Lactucarium
Lappa	Burdock
Laricis cortix	Larch bark
Lauro-cerasi folia	Cherry laurel leaves
Laurus camphora	Camphor -
Lavandula	Lavendar
Leptandra	Culver's root
Limonis	Lemons
Limonis cortex	Lemon peel
Limonis succus	Lemon juice
Linum	Flaxseed
Lini farina	Flaxseed meal
Linium Usitatissimum	Flaxseed
Liquor calcis	**Lime water**
Liquor plumbi subacetate	Lead water
Lithii benzoas	Benzoate of lithium
Lithii bromidum	Bromide of lithium
Lithii carbonas	Carbonate of lithium
Lithii citras	Citrate of lithium
Lithii salicylas	Salicylate of lithium
Lobelia	Lobelia
Lotio hydrargyri nigra	Black wash
Lupulinum	Lupulin (lupulinic glands)
Lycopodium	Lycopodium
Macis	Mace
Magnesia	Magnesia (light magnesia)
Magnesia sulphas	Epsom salts
Magnolia	Magnolia
Maltum	Malt
Mangani oxidum nigrum	Black oxide of manganese
Mangani sulphas	Sulphate of manganese
Manna	Manna
Maranta arundinacea	**Arrow root**
Marrubium	Horehound
Massa hydrargyri	Blue mass pill
Mastiche	Mastic
Matico	Matico
Matricaria	German chamomile
Mel	Honey
Melissa	Balm
Menispermum	Canadian moonseed
Mentha piperita	Peppermint

Latin	English
Mentha puligium	Pennyroyal
Mentha viridis	Spearmint
Menthol	Menthol
Menthol salicylis	Menthol Salicylate
Mezereum	Mezereum
Mica panis	Crumb of bread
Mistura creta	Chalk mixture
Mori succus	Mulberry juice
Morphina	Morphine
Moschus	Musk
Myristica	Nutmeg
Myrrha	Myrrh
Narthex asafoetida	Asafetida
Nectandrae cortex	Nectandra, beeberu bark
Nux vomica	Nux vomica
Oleum adipis	Lard oil
Oleum amygdalae	Oil of almonds
Oleum caryophylli	Oil of cloves
Oleum cubebae	Oil of cubebs
Oleum gaultheria	Oil of wintergreen
Oleum morrhuae	Cod-liver oil
Oleum olivae	Sweet oil
Oleum ricini	Castor oil
Oleum terebinthinae	Turpentine
Oleum tiglium	Croton oil
Opium	Opium
Origanum	Wild marjoram
Os usturn	Bone ash
Ovi albumina	Egg albumin
Ovi vitellus	Yolk of eggs
Papaveris capsula	Poppy capsules
Papaveris somniferum	Poppy-heads
Parafferium durum	Hard paraffin
Pareira	Pareira brava
Pepo	Pumpkin seed
Pepsinum saccharatum	Saccharated pepsin
Petrolatum	Petroleum ointment
Phosphorus	Phosphorus
Physostigma	Calabar bean
Physostigmina	Physostigmine
Phytolaccae	Poke berry
Phytolaccae radix	Poke root
Picrotoxinum	Picrotoxin
Pigmentum indicum	Indigo
Pilocarpus	Jaborandi
Pilulae masse hydrargyri	Blue-mass pill
Pimenta	Allspice
Piper	Pepper (black pepper)
Piperina	Piperine
Pix	Pitch
Pix liquida	Tar
Plumbi acetas	Sugar of Lead
Plumbum	Lead
Podophyllum	May-apple
Potassii bitartras	Cream of tartar
Potassii nitras	Saltpetre
Potassium	Potassium
Potassa	Potassa
Prinos	Black alder
Prunum	Prune
Prunus virginiana	Wild-cherry
Pulsatilla	Pulsatilla
Pulv. Ipecac et opii	Dover's powders
Pyrethrum	Pellitory
Pyroxylinum	Soluble gun cotton
Quassia	Quassia
Quercus alba	White oak
Quercus cortex	Oak bark
Quercus infectoria	Nutgalls
Quillaia	Soap bark
Quinidinae sulphas	Sulphate of quinidine
Quinina	Quinine
Resina	Resin
Rhamni purshiani cortex	Sacred bark Chittim bark Cascara sagrada
Rhus	Rhubarb
Rhus glabra	Rhus glabra; oak
Rhus toxicodendron	Rhus toxicodendron
Rosa centifolia	Pale rose
Rosa gallica	Red rose
Rosmarinus	Rosemary
Rubus	Blackberry
Rubus Idams	Raspberry
Rumex	Rumex
Sabadilla	Cevadilla
Sabina	Savine
Saccharum	Sugar
Saccharum albe	White sugar
Saccharum lactis	Sugar of milk
Sagus rumphii	Saco
Salicinum	Salicin
Salix	Salix
Salvia	Salvia
Sambucus	Elder
Sanguinaria	Bloodroot
Santalum rubrum	Red saunders
Santonica	Levant wormseed
Santoninum	Santonin
Soap	Soap
Sarsaparilla	Sarsaparilla
Sassafras	Sassafrass
Sassafras medulla	Sassafrass pith
Scammonium	Scammony
Scilla	Squill
Scoparius	Broom
Scutellaria	Scullcap
Senega	Senega
Senna	Senna
Serpentaria	Virginia snakeroot
Sevum	Suet
Sinapis	Mustard
Sinapis alba	White mustard
Sinapis nigra	Black mustard
Smilax Officinale	Sarsaparilla
Sodii biboras	Borax
Sodii bicarbonas	Baking soda
Soda	Soda
Solanium dulcamara	Bitter sweet
Spigelia	Pinkroot
Spiritus frumenti	Whiskey
Spiritus vini gallici	Brandy

LATIN	ENGLISH
Staphisagria	Stavesacre
Stillingia	Queen's root
Stramonii folia	Stramonium leaves
Sodii chloridum	Salts
Sodii et Potassi tartras	Rochelle salts
Sodii phosphas	Phosphate of soda
Sodii sulphas	Glauber salts
Stramonii semen	Stramonium seed
Strychina	Strychnine
Styrax	Styrax
Sulphuris iodidum	Iodide of sulphur
Sulphur lotum	Washed sulphur
Sulphur praecipitatum	Precipitated sulphur
Sulphur rotundum	Brimstone
Sulphur sublimatum	Sublimed sulphur
Sumbul	Sumbul
Syrupus acaciae	Syrup of gum arabic
Syrupus acidi citrici	Syrup of citric acid
Syrupus acidi hydriodici	Syrup of hydriodic acid
Syrupus allii	Syrup of garlic
Syrupus althæae	Syrup of althæa
Syrupus amygdala	Syrup of almond
	Syrup of orgeat
Syrupus aurantii	Syrup of orange
Syrupus aurantii florum	Syrup of orange flowers
Syrupus calcii lactophosphatis	Syrup of Lactophosphate of calcium
Syrupus ferri bromidi	Syrup of bromide of iron
Syrupus ferri iodidi	Syrup of iodide of iron
Syrupus ferri phosphatis	Syrup of phosphate of iron
Syrupus ferri quininae	Syrup of the phosphates of iron
Quinina et strychinae phosphatum	Quinine and strychnine
Syrupus hypophosphitum	Syrup of hypophosphites
Syrupus hypophosphitum cum ferro	Syrup of hypophosphites with iron
Syrupus ferri quininae et strychinae phosphatum	Syrup of the phosphates of iron, quinine and strychnine
Syrupus ipecacuanhae	Syrup of ipecac
Syrupus krameriae	Syrup of krameria
Syrupus lactucarii	Syrup of lactucarium
Syrupus limonis	Syrup of lemons
Syrupus mori	Syrup of mulberries
Syrupus papaveris	Syrup of poppies
Syrupus picis liquidae	Syrup of tar
Syrupus pruni Virginianae	Syrup of wild-cherry
Syrupus rhus	Syrup of rhubarb
Syrupus rhus aromaticus	Aromatic Syrup of rhubarb
Syrupus rosae	Syrup of rose
Syrupus rubi	Syrup of blackberry
Syrupus rubi idaei	Syrup of raspberry
Syrupus sarsaparilla compositus	Compound syrup of sarsaparilla
Syrupus scillae	Syrup of squill
Syrup scillae compositus	Compound syrup of squill
Syrupus senegae	Syrup of senega
Syrupus sennae	Syrup of senna
Syrupus tolutanus	Syrup of tolu
Syrupus zingiberis	Syrup of ginger
Tabacum	Tobacco
Tamarindus	Tamarind
Tanacetum	Tansy
Taraxacum	Dandelion
Terebinthina	Turpentine
Theobroma cacao	Chocolate
Theriaca	Treacle (molasses)
Thuja	Arbor vitae
Thymol	Thymol
Tinctura opii	Laudanum
Tinctura opii camphorata	Paregoric
Tragacantha	Tragacanth
Triticum	Couch-grass
Ulmus	Elm (slippery elm)
Ustilago	Corn smut
Uvae	Raisins
Uva ursi	Bearberry
Valeriana	Valerian
Vanilla	Vanilla
Veratrina	Veratrine
Veratrum viride	American hellebore
Viburnum	Black haw
Viburnum opulus	Cramp bark
Vinum album	White wine
Vinum rubrum	Red wine
Vina medicata	Medicated wines
Viola tricolor	Pansy
Vitellus	Yolk of egg
Xanthoxylum	Prickly ash
Zincum	Zinc
Zinci acetas	Acetate of zinc
Zinci Chloridum	Chloride of zinc
Zinci iodidum	Iodide of zinc
Zinci oxidum	Oxide of zinc
Zinci sulphas	Sulphate of zinc
Zingiber	Ginger

TABLE OF MEDICINES AND DOSES

No fixed rule can be applied to dosage for various reasons. Primarily because one individual may be more readily affected by drugs than another, or the drugs may be so antagonized by the disease process as to render very large doses necessary. Therefore, dosage must be varied to suit the case, and taking into consideration age and sex.

The following table gives a full list of medicines ordinarily used, with their properties and the doses suitable for adults. The dose for a child may be determined, excepting in a few dangerous medicines, by this rule: *Add twelve to the child's age in years and divide the sum by the child's age. The quotient shows what proportion of the dose for an adult is to be used.* Thus:

Child's age in years..... 6
Add 12

Divide by child's age.....6)18(3

and the dose for a child of six years is found to be one-third of the dose for an adult. This rule is not a law, however, for of narcotics children should receive less than this (one-half), and of purgatives or laxatives more than this (say two or three times).

Medicines and Properties.	Doses.
Acetanilid; febrifuge, anodyne	1 to 5 grains
Aconite root, tincture of; narcotic, sedative and nauseant	1 to 3 drops 3 times a day
Aloes socotrine, powdered; purgative	5 to 10 grains
Aloes socotrine, pills of; purgative	2 to 3 pills at bedtime
Aloes socotrine, tincture of; purgative	1 to 3 drams at bedtime
Aloes and myrrh, tincture of; emmenagogue	1 to 2 teaspoonfuls 2 or 3 times a day
Aloes and myrrh, pills of; emmenagogue	3 or 4 pills twice a day
Alum, powdered; astringent and emetic	3 to 30 grains
Alum, burned; escharotic	10 to 15 grains moistened with water applied externally
Ammonia, carbonate of; stimulant	5 to 6 grains every 2 to 4 hours
Ammonia, water of (spirits of hartshorn); stimu. and caustic	8 to 12 drops diluted with water.
Ammonia aromatic, spirits of; stimulant	10 to 20 drops diluted in water
Ammonia liniment (volatile); rubefacient	applied externally

Medicines and Properties.	Doses.
Ammoniac mixture; expectorant	tablespoonful 3 or 4 times a day
Ammonium chloride; expectorant	5 to 10 grains
Angelica root, fluid extract of; stimulant and aromatic	teaspoonful 3 or 4 times a day
Angelica root, decoction of; stimulant and aromatic	wineglassful 2 to 4 times a day
Anise-seed, essence of; aromatic and carminative	1 to 2 teaspoonfuls
Antimonial wine; emetic	2 to 3 teaspoonfuls
Antipyrine; febrifuge	3 to 5 grains
Arrowroot, Bermuda; nutritive and tonic	as a gruel
Arsenic, Donovan's compound solution of; alternative	5 to 10 drops 3 times a day
Arsenic, Fowler's solution of; alternative and febric	1 to 5 drops 3 times a day
Asafetida, pills of; anti-spasmodic	1 to 2 pills
Asafetida, milk of; anti-spasmodic	1 to 2 teaspoonfuls
Asafetida, tincture of; anti-spasmodic	25 to 40 drops
Balsam of copaiva; diuretic, laxative and stimulant	20 to 30 drops 3 times a day
Balsam of fir; diuretic	10 to 15 drops
Balsam of Peru; stimulant and tonic	5 or 10 drops twice a day
Balsam of tolu, tincture of; stimulant and tonic	20 to 40 drops
Belladonna, tincture of; diaphoretic, diuretic and narcotic	3 to 5 drops
Belladonna, plaster of; anodyne and diaphoretic	applied externally
Belladonna, ointment of; anodyne	applied externally
Bismuth, subnitrate of; anti-spasmodic, absorbent, sedative	5 to 10 grains 3 times a day
Bitter sweet, fluid extract of; emetic and narcotic	30 to 40 drops 3 times a day
Black drop (vinegar of opium); narcotic	10 to 12 drops
Black cohosh, decoction of; narcotic, diaphoretic and diuretic	wineglassful 3 times a day.
Black cohosh, tincture of; narcotic, diaphoretic and diuretic	teaspoonful 3 or 4 times a day.
Blackberry root, decoction of; astringent and tonic	wineglassful 3 or 4 times a day
Blackberry root, fluid extract of; astringent and tonic	teaspoonful 3 times a day
Blackberry root, syrup of; astringent	tablespoonful 3 to 6 times a day
Blue vitriol; emetic	1 to 3 grains
Blue mass pills; alterative and sialagogue	1 or 2 pills (5 grains each)
Boneset, infusion of; stimulant, sudorific and emmenagogue	1 to 2 tablespoonfuls 3 or 4 times a day.
Boneset, fluid extract of; stimulant, sudorific and emmenagogue	30 to 40 drops 3 or 4 times a day.
Borax, powdered; nephitic and deterient	15 to 25 grains
Buchu, infusion of; diaphoretic and diuretic	tablespoonful 4 or 5 times a day
Buchu, fluid extract of; diaphoretic and diuretic	teaspoonful 3 or 4 times a day
Buckthorn, fluid extract of; hydragogue cathartic	teaspoonful at bedtime
Burdock, fluid extract of; herpetic anti-scorbutic	tablespoonful
Calomel; alterative and laxative	½ to 5 grains
Camphor, gum; anti-spasmodic and sedative	2 to 5 grains
Camphor, spirits of; anti-spasmodic and sedative	10 to 25 drops
Camphor, water of; anodyne and sedative	2 to 4 teaspoonfuls
Calamus root, fluid extract of; aromatic, stimulant and stomachic	teaspoonful
Caraway seed, infusion of; aromatic and carminative	tablespoonful
Cardamom seed, tincture of; aromatic and stimulant	1 to 2 teaspoonfuls
Cardamom, compound tincture of; stomachic	1 to 2 teaspoonfuls

Medicines and Properties.	Doses.
Cascara sagrada, fluid extract of; tonic laxative	10 to 30 drops
Catechu, powdered; astringent	15 to 30 grains
Catechu, tincture of; astringent	10 to 30 drops
Catnip, decoction of; diaphoretic, stomachic and corrective	tablespoonful
Cayenne pepper, powdered; stimulant	3 or 6 grains
Cayenne pepper, tincture of; stimulant	10 to 15 drops
Castor oil; purgative	1 to 2 tablespoonfuls
Chamomile flowers, cold infusion of; tonic and stomachic	1 to 2 tablespoonfuls 3 times a day.
Chalk, prepared; antacid and astringent	10 to 30 grains in mucilage
Chalk mixture; antacid and astringent	2 or 3 teaspoonfuls
Chloroform; narcotic and sedative	10 to 60 drops in mucilage
Chloroform, liniment of; anesthetic and anodyne	applied externally
Cinnamon, powdered; astringent and stomachic	5 to 15 grains
Cinnamon, oil of; astringent and stomachic	2 to 4 drops
Cinnamon, essence of; astringent and stomachic	20 to 25 drops
Cloves, powdered; aromatic, carminative and stimulant	10 to 15 grains
Cloves, oil of; stimulant, aromatic and carminative	1 to 5 drops
Colombo root, decoction of; tonic	tablespoonful 3 times a day
Colchicum root, wine of; narcotic, diuretic and sedative	10 to 30 drops 3 times a day
Colchicum seed, tincture of; narcotic, diuretic and sedative	10 to 30 drops 3 times a day.
Corrosive sublimate; antisyphilitic	1-60 to ⅛ grain 2 or 3 times a day
Cotton root, fluid extract of; emmenagogue, parturient and abortive	20 to 30 drops
Cream tartar; aperient and refrigerant	teaspoonful in water
Cubebs, powdered; stimulant and diuretic	20 to 30 grains
Cubebs, fluid extract of; stimulant and diuretic	20 to 30 drops
Cubebs, tincture of; stimulant and diuretic	1 to 2 teaspoonfuls
Cubebs, oil of; stimulant and diuretic	10 to 12 drops on sugar
Dandelion, fluid extract of; alterative, aperient, tonic and diuretic	1 to 2 teaspoonfuls
Dogwood bark, decoction of; tonic, astringent and stimulant	wineglassful 2 or 3 times a day.
Dover's powder; diaphoretic	5 to 15 grains at bed-time
Elder flower, decoction of; alterative, diaphoretic and diuretic	1 to 2 tablespoonfuls
Elm bark, infusion of; demulcent and diuretic	wineglassful
Epsom salts; cathartic	2 or 3 teaspoonfuls before breakfast
Ergot, powdered (fresh); astringent	15 to 30 grains
Ergot, fluid extract of; astringent	15 to 60 drops
Ergot, tincture of; astringent	1 teaspoonful
Ergot, wine of; astringent	1 teaspoonful
Fennel seed, infusion of; aromatic and carminative	tablespoonful
Fennel seed, oil of; aromatic and carminative	3 to 6 drops
Fever-root, decoction of; diuretic, cathartic and emetic	tablespoonful
Flaxseed, infusion of; demulcent	wineglassful every 3 or 4 hours
Flaxseed, poultice of; astringent	excellent for drawing
Flaxseed, oil and lime-water; astringent	applied to scalds and burns
Foxglove, powdered (digitalis); diuretic, narcotic and sedative	½ to 1 grain 2 or 3 times a day.
Foxglove, tincture of; diuretic, narcotic and sedative	5 to 15 drops 2 or 3 times a day

Medicines and Properties.	Doses.
Garlic, syrup of; expectorant	1 to 2 teaspoonfuls
Gaultheria, oil of (wintergreen); antirheumatic	2 to 10 drops
Gentian, tincture of; tonic	1 teaspoonful
Ginger, powdered; stimulant and carminative	20 to 30 grains
Ginger, tincture of; stimulant and carminative	15 to 30 drops
Glauber salts; aperient and cathartic	1 to 2 teaspoonfuls before breakfast
Gelsemium, fluid extract of; narcotic, sedative, diaphoretic and febrifuge	2 to 5 drops
Gelsemium, tincture of; narcotic, sedative, diaphoretic and febrifuge	5 to 10 drops
Gum arabic, mucilage of; demulcent	tablespoonful every 3 or 4 hours
Guaiacum, tincture of; diaphoretic and diuretic	teaspoonful 2 or 3 times a day
Henbane, tincture of; narcotic and anodyne	15 to 30 drops
Henbane, fluid extract of; narcotic and anodyne	5 to 15 drops
Hoarhound, decoction of; sudorific, pectoral, aperient and tonic	tablespoonful
Hoarhound, syrup of; sudorific and pectoral	tablespoonful
Hops, tincture of; nerve tonic and sedative	1 to 2 teaspoonfuls every 4 hours
Hydrastine (active principle of yellow root); astringent, tonic, stomachic, antibilious	1 to 2 grains.
Hypophosphites, syrup of; tonic	½ to 1 teaspoonful 3 times a day
Iodine, tincture of; alterative and discutient	applied to scrofulous tumors
Iodine, ointment of; discutient	applied to scrofulous tumors
Iron, carbonate (rust) of; tonic	5 to 10 grains
Iron, syrup of iodine of; alterative, diuretic and tonic	5 to 10 drops twice a day
Iron tincture, muriate of; tonic	10 to 30 drops
Irish moss, infusion of; nutritive, demulcent and expectorant	tablespoonful
Ipecac, powdered; emetic and diaphoretic	20 grains
Ipecac, fluid extract of; emetic and diaphoretic	20 to 25 drops
Ipecac, wine of; emetic and diaphoretic	1 to 2 teaspoonfuls
Ipecac, syrup of, emetic and diaphoretic	teaspoonful repeated
Jalap, powdered, cathartic	15 to 30 grains
Juniper berries, infusion of; diuretic	wineglassful 3 or 4 times a day
Lactucarium; anodyne	5 to 10 grains
Lady's-slipper root, decoction of; nervine	tablespoonful
Laudanum; narcotic	5 to 20 drops
Lead, acetate (sugar) of; astringent and sedative	1 to 3 grains every 3 or 4 hours
Lead, Goulard's extract of; anodyne and sedative	1 ounce diluted with 1 pint of water; applied externally to reduce inflammation.
Licorice root, decoction of; demulcent and expectorant	wineglassful
Life-everlasting, decoction of; astringent, diaphoretic, stomachic	1 to 2 tablespoonfuls
Liverwort, decoction of; astringent, demulcent and pectoral	1 to 2 tablespoonfuls
Lobelia herb, infusion of; emetic and diaphoretic	2 teaspoonfuls
Lobelia herb, powdered; emetic and diaphoretic	10 to 15 grains
Lobelia seed, tincture of; diaphoretic, emetic and expectorant	20 to 40 drops
Magnesia, carbonate; antacid and laxative	15 to 60 grains
Magnesia, calcined; antacid and laxative	15 to 60 grains
May-apple root, powdered; cathartic, hydragogue and emetic	15 to 20 grains at bedtime.
May-apple root, powdered; cathartic, hydragogue and emetic	15 to 20 grains at bedtime.
Manna; laxative	1 to 2 drachms before breakfast

Medicines and Properties.	Doses.
Manna, syrup of; laxative	1 to 2 tablespoonfuls before breakfast
Mercury with chalk; alterative	2 to 10 grains
Mercury, mass of (blue pill); cathartic	3 to 10 grains
Mercury, red precipitate ointment; stimulant	applied externally
Mercurial ointment (blue); resolvent, antiparasitic	applied externally
Morphine, sulphate of; anodyne and soporific	⅛ to ¼ grain
Mustard seed (black), ground; diuretic, emetic and stimulant	½ to 1 teaspoonful
Mustard seed (white), ground; diuretic, emetic and stimulant	wineglassful
Nitrate of silver (crystals); astringent, antispasmodic	1-6 to ¼ grain 2 or 3 times a day.
Nitrate of silver, lunar caustic (sticks); escharotic	applied externally
Nut-galls, tincture of; astringent	1 to 2 teaspoonfuls
Nut-galls, ointment of; astringent	1 to 2 teaspoonfuls
Nux vomica, tincture of; diuretic, excrement, stimulant and tonic	15 drops 3 times a day.
Nux vomica, fluid extract of; diuretic, excrement, stimulant and tonic	1 to 5 drops 2 or 3 times a day.
Opium, powdered; narcotic and stimulant	1 grain at bedtime
Opium, tincture of. (See Laudanum.)	
Opium, camphorated tincture of. (See Paregoric.)	
Paregoric; anodyne	1 to 2 teaspoonfuls
Pennyroyal, infusion of; diaphoretic, emmenagogue, stimulant	wineglassful every hour
Peppermint, infusion of; stimulant and carminative	wineglassful 2 or 3 times a day
Peruvian bark, powdered; febrifuge and tonic	1 drachm 2 or 3 times a day
Peruvian bark, decoction of; febrifuge and tonic	wineglassful 3 or 4 times a day
Peruvian bark, fluid extract of; tonic and febrifuge	30 to 60 drops 3 times a day
Pepsin, pure; digestant	15 to 60 grains
Pepsin, saccharated; digestant	30 grains to ½ ounce
Pepsin, liquor; digestant	2 to 4 teaspoonfuls
Phenacetine; antipyretic, antineuralgic	2 to 5 grains
Pinkroot, infusion of; anthelmintic	tablespoonful before meals
Pinkroot, fluid extract of; anthelmintic	½ to 1 teaspoonful before meals
Pinkroot and senna, fluid extract of; anthelmintic, purgative	teaspoonful before meals
Podophyllin (active principle of mandrake); diuretic, purgative	1 to 3 grains at bedtime.
Potash, chlorate	10 to 15 grains dissolved in water
Potash, citrate; refrigerant and diaphoretic	20 to 25 grains
Potash, nitrate (saltpetre); refrigerant and diaphoretic	6 to 12 grains
Potassium, bromide of; antiscorbutic, nerve sedative	5 to 60 grains
Potassium, iodide of; alterative and antisyphilitic	5 to 15 grains 3 times a day
Rochelle salts; aperient	2 to 3 drachms before breakfast
Rhatany root, decoction of; astringent and tonic	tablespoonful
Rhatany root, tincture of; astringent and tonic	teaspoonful
Rhubarb, powdered; astringent and cathartic	20 to 30 grains
Rhubarb, tincture of; astringent and cathartic	1 to 2 teaspoonfuls
Rhubarb, fluid extract of; cathartic and astringent	25 to 40 drops
Rhubarb, syrup of; cathartic and astringent	2 or 3 teaspoonfuls
Rue herb, decoction of; tonic, anthelmintic and emmenagogue	tablespoonful
Saffron (American), infusion of; diaphoretic	2 to 3 teaspoonfuls

Medicines and Properties.	Doses.
Saffron (Spanish), infusion of; diaphoretic	1 to 2 teaspoonfuls
Sage, infusion of; sudorific and stomachic	wineglassful
Sassafras pith, infusion of; demulcent and anodyne	1 or 2 teaspoonfuls; also applied to sore eyes.
Sassafras bark, infusion of; diaphoretic and stimulant	wineglassful every 2 or 3 hours
Sarsaparilla, decoction of; alterative and deobstruent	teacupful 3 times a day
Sarsaparilla, fluid extract of; alterative and deobstruent	teaspoonful 3 times a day
Sarsaparilla, compound syrup of; alterative, deobstruent	tablespoonful 4 to 6 times a day.
Scammony; cathartic	5 to 15 grains at bedtime
Senega (snakeroot), fluid extract of; expectorant, stimulant and diuretic	5 to 20 drops
Senna, decoction of; cathartic	1 to 2 tablespoonfuls
Senna, fluid extract of; cathartic	1 to 4 teaspoonfuls
Stramonium leaves, tincture of; narcotic, sedative, antispasmodic	10 to 20 drops 2 or 3 times a day.
Stramonium leaves, ointment of; sedative	applied externally
Soda, bicarbonate; antacid	15 to 30 grains
Seidlitz powders; aperient	1 powder before breakfast
Sweet spirits of nitre; diaphoretic, diuretic and febrifuge	30 to 60 drops
Tansy (double), decoction of; sudorific, emmenagogue, anthelmintic	1 to 2 tablespoonfuls.
Thyme, infusion of; aromatic and stomachic	wineglassful
Uva ursa leaves, decoction of; diuretic and tonic	wineglassful 3 or 4 times a day
Uva ursa, fluid extract of; diuretic and tonic	½ to 1 teaspoonful 3 or 4 times a day
Waterpepper herb, tincture of; stimulant, diuretic and emmenagogue	teaspoonful
Wild cherry bark, cold infusion of; tonic, astringent, sedative	tablespoonful 3 times a day.
Wild cherry bark, syrup of; sedative	tablespoonful 3 times a day
Witch-hazel; anodyne, astringent, sedative, styptic	1 to 2 teaspoonfuls; also, externally to reduce inflammation.

GLOSSARY

Giving definitions of all medical and technical terms contained in this work.

A

Abdomen (ab-do'men). The belly; the cavity in the body betwen the thorax and the pelvis.
Abdominal (ab-dom'in-al). Pertaining to the abdomen.
Aberration (ab-er-a'shun). Deviation from the normal.
Abirritant (ab-ir'it-ant). Allaying irritation.
Ablution (ab-lu'shun). The process of cleansing the body.
Abnormal (ab-norm'al). Contrary to the natural law.
Abolition (ab-o-lish'un). Complete suspension, as of a function.
Abort (ab-ort'). To miscarry; to arrest the development of a disease.
Abortion (ab-or'shun). Premature expulsion of a fœtus.
Abortive (ab-ort'iv). Prematurely born.
Abrasion (a-bra'shun). A wearing off of the skin or mucous membrane.
Absinthe (ab'sinth). A cordial containing oil of wormwood and aromatics.
Absinthium (ab-sinth'um). Wormwood; cardiac stimulant and stomachic tonic.
Absorbent (ab-sorb'ent). Taking up by suction; a drug that produces absorption of diseased tissue.
Absorption (ab-sorp'shun). The inhibition of one body by another, as of the lens after rupture of the capsule.
Abstemious (ab-ste'me-ous). Moderate in matters of diet.
Abstinence (ab'stin-ence). Voluntary privation of self-denial in diet.
Abstract (ab'strakt). A preparation containing the soluble principles of a drug evaporated and mixed with sugar of milk.
Abstraction (ab-strak'shun). Blood letting.
Acacia (ah-ka'she-ah). A genus of shrubs and trees. Gum arabic.
Accelerate (ak-sel'er-ate). To hasten; to quicken action.
Accentuate (ak-sen'tu-ate). To emphasize.
Accentuation (ak-sen-tu-a'shun). Increased distinctness.
Access (ak'ses). The beginning or onset of a disease.
Accession (ak-sesh'un). The same as access.
Accouchement (ak-koosh'ment). Delivery in child-bed.
Acetate (as'et-at). A salt of acetic acid.
Achorion (ah-ko're-on). A genus of fungous organisms in the skin.
Acid (as'id). A sour substance.
Acidity (as-id'it-e). Sourness; tartness; sharp to the taste.
Acme (ak'me). The crisis or height of a disease.
Acne (ak'ne). Inflammation of the sebaceous glands from retained secretion.
Acne Rosacea (ak'ne ro-za'she-ah). Chronic congestion of the skin of the face.
Aconite (ak'o-nit). Same as aconitum.
Aconitum (ak-on-i'tum). A genus of herbs and also the poisonous roots and leaves of monk's hood; cardiac sedative.
Acrid (ak'rid). Burning; pungent.
Acute (a-kut'). Rapid; severe; sharp; keen.
Adaptation (a-dap-ta'shun). The adjustment of the pupil to light variations.
Adenitis (ad-en-i'tis). Inflammation of a gland.
Adenoid (ad'e-noid). Resembling a gland.
Adenoma (ad-en'o-mah). A glandular tumor.
Adenosis (ad-en-o'sis). Any chronic abnormality of the glands.
Adeps (ad'eps). Lard.
Adequate (ad'e-quate). Equal; proportionate; fully sufficient.
Adipose (ad'i-pos). Fatty.
Adipose Arteries (ad'i-pos ar'ter-ez). Arterial branches, supplying the renal fat.
Adipose Tissue (ad'i-pos tish'u). Fat cells united by connective tissue.
Adiposis (ad-i-po'sis). Corpulence; fatty degeneration.
Adult (a-dult'). Having arrived at mature years; of full size and strength.
Adynamia (ad-in-a'me-ah). A deficiency or loss of vital power.
Aeration (a-er-a'shun). Admixture or impregnation with air.
Aerial (a-er'e-al). Pertaining to the air.
Affinity (afin'i-te). Relationship; a synonym of attraction.
Afflatus (a-fla'tus). A variety of acute erysipelas. A current of air.
Affusion (a-fu'shun). A pouring upon, as water on the body.
Agaricus (a-gar'i-kus). A genus of fungi.
Agenesia (ah-jen-e'ze-ah). Abnormal or imperfect development.
Agenesis (ah-jen'e-sis). The same as agenesia.
Agent (a'jent). A substance that produces changes in the body.
Agglutinative (a-glu'ti-na-tiv). Adhesive; a substance with adhesive properties.
Agglutinin (a-glu'ti-nin). A substance in the blood-serum or immunized individuals which has the property of agglutinating bacteria.
Agility (a-gil'i-te). The power of moving the limbs quickly. Activity.
Agitation (aj-i-ta'shun). Violent excitement; a shaking.
Akimbo (a-kim'bo). At an acute angle; said of the arms when the hands rest on the hips and the elbows project outward.
Albumen (al-bu'men). The white of an egg. Food material in a seed between the embryo and seed-coats.
Albumin (al-bu'min). A proteid animal or vegetable which is soluble in water and coagulated by heat.
Albumin Acid (al-bu'min as'id). That changed by the action of acid.
Albuminate (al-bu'min-ate). A basic compound of albumin.
Albuminoid (al-bu'min-oid). Resembling albumen. A substance resembling true proteids in origin and composition.

Albuminuria (al-bu-min-u're-ah). Presence of albumin in the urine.
Albumon (al-bu'mon). A protein found in the blood; it cannot be coagulated by heat.
Alchemy (al'kem-e). The supposed art of changing base metals into gold and of discovering the elixir of life.
Aliment (al'i-ment). Nourishment; food.
Alimentary (al-i-men'ta-re). Having the quality of nourishing.
Alimentary Canal (al-i-men'ta-re ka-nal'). The whole digestive tube from the mouth to the anus.
Alimentation (al-imen-ta'shun). The process of nourishment.
Alimentation, Rectal (al-i-men-ta'shun rec'tal). Nourishing by injection of food into the rectum.
Alkali (al'ka-li). An electropositive substance combining with an acid to form a neutral salt.
Alkaline (al'ka-lin). Having the properties of an alkali.
Alkanet (al'kan-et). The herb alkanna tinctoria; the root yields a red dye.
Allay (al-la'). To abate; to assuage; to subside.
Alleviate (al-e'vi-ate). To ease; to mitigate; to make more bearable.
Allium (al'e-um). A genus of plants.
Allium Cepa (al'e-um ce'pa). Common onion.
Allium Sativum (al'e-um sa-ti'vum). Garlic; a diuretic and stimulant.
Allotropy (a-lot'ro-pe). A variation of physical properties without a change in chemic composition.
Alluvial (al-lu've-al). Belonging to soil formed by deposits of mud.
Alopecia (al-o-pe'se-ah). Loss of the hair.
Alterative (al'ter-a-tiv). A medicine that alters the processes of nutrition and excretion, restoring the normal body functions.
Alternately (al-ter'nate-le). In a reciprocal succession; by turns; as night follows day and day follows night.
Alternation of Generation (al-ter-na'shun of jen-e-ra'shun). A form of reproduction in which members can produce new beings non-sexually, while in the final stage reproduction is always sexual.
Alveole (al-ve-ol). A small cell, cavity or depression in a surface; a tooth socket.
Alvine (al-vin). Pertaining to the belly or intestines.
Alvine Concretion (al-vin kon-kre'shun). Intestinal calculus.
Alvine Discharges (al'vin dis-charg'ez). The discharge of the bowels.
Alvin Flux (al'vin fluks). Diarrhœa.
Alvus (al'vus). The belly or its contents.
Amalgam (a-mal'gam). An alloy containing mercury.
Amaurosis (am-au-ro'sis). Partial or total blindness.
Ambiguity (am-bi-gu'i-te). Uncertain; doubtful; of double meaning.
Amblyopia (am-ble-o'pe-ah). Dimness of vision.
Ameba (am-e'bah). A genus of rhizo pods; an individual in the above genus.
Ameboid (a-me'boid). Having the movements of an ameba.
Amelia (ah-me'le-ah). Absence of the limbs, from birth or atrophic.
Amelioration (a-mel-i-o-ra'shun). Becoming better; improvement.
Amenorrhea (a-men-o-re'a). Irregularity or suppression of the menses.
Ammonium (am-mo'ne-um). A hypothetic alkaline base existing only in combination.
Amnesia (am-ne'ze-ah.) A loss of memory for words.
Amoeba (am-e'bah). See ameba.
Amputation (am-pu-ta'shun). The operation of cutting off a limb or part of a limb.
Amygdalitis (am-ig-dal-it'tis). Tonsillitis.
Amylaceous (am-il-a'se-us). Containing starch.
Amylolytic (am-il-o-lit'ik). Converting starch into sugar.
Analog or Analogue (an'a-log). A part or organ similar in function to another but different in structure.
Analogous (an-al'a-gus). Conforming or answering to; bearing resemblance.
Analysis (an-al'i-sis). The resolution of a body into its elements.
Analysis Gasometric (an-al'i-sis gas-o-met'ric). That of gaseous compounds.
Anam Ulcer (an'am ul'sur). A form of phagedena common in the tropics.
Anamnesis (an-am-ne'sis). The past history of a disease.
Anaphia (an-a'fe-ah). A deficient sense of touch.
Anaphoresis (an-af-or-e'sis). Insufficient perspiration.
Anasarca (an-as-ar'kah). General dropsy.
Anastomosis (an-as-to-mo'sis). The junction of vesels or hollow organs.
Anatomically (an-a-tom'i-cal-e). In an anatomical manner; by means of dissection; according to anatomy.
Anatomy (an-at'o-me). The science of organic structure.
Anchylosis (an-kil-o'sis). See ankylosis.
Anemia (an-e'me-ah). A deficiency of blood or of red corpuscles.
Anemic (an-em'ik). Pertaining to anemia.
Aneroid (an'er-oid). Dispensing with fluid.
Anesthesia (an-es-the'ze-ah). A state of insensibility.
Anesthetic (an-es-thet'ik). A substance producing anesthesia.
Aneurism (an'u-rizm). A dilatation of an artery.
Angina (an-ji'nah). A sense of suffocation.
Anginose (an'jin-oz). Affected with angina.
Angioleucitis (an-je-o-lu-si'tis). Inflammation of the lymphatics.
Animation (an-i-ma'shun). The act of infusing life; the state of being animated.
Ankylosis (an-kil-o'sis). Union of the bones forming a joint resulting in a stiff joint.
Annular (an'u-lar). Ring-like.
Annular Ligament (an'u-lar lig'a-ment). The ligament around the wrist and ankle.
Anodyne (an'o-din). A medicine relieving pain.
Antacid (ant-as'id). An alkali; neutralizing acidity.
Antagonist (an-tag'o-nist). A drug neutralizing the effects of another, or a muscle opposing the action of another.
Antaphrodisiac (ant-af-ro-dis'i-ak). A medicine which cools the animal passion.
Antecedent (an-te-ced'ent). A person or thing that goes before, with reference to time, place, position, etc.
Anterior (an-ter'e-or). Situated before or in front of.
Anteroposterior (an-ter-o-pos-te're-or). From before; backward.
Anthelmintic (an-thel-min'tik). A remedy expelling worms.
Antibilious (an-te-bil'yus). Opposing biliousness.
Antidote (an'ti-dot). An agent counteracting the action of a poison.
Antifermentative (an-te-fer-men'ta-tiv). Arresting fermentation.
Antimorbific (an-te-mor-bif'ic). That which opposes disease.
Antiperiodic (an-te-per-i-od'ik). A remedy for periodical disease.
Antiphlogistic (an-te-flo-jist'ik). An agent reducing inflammation or fever.
Antipruritic (an-te-pru-rit'ik). Relieving itching.

Antipyretic (an-ti-pi-ret'ik). Reducing temperature.
Antiscorbutic (an-te-skor-bu'tik). A remedy for scurvy.
Antiseptic (an-te-sep'tik). Preventing or destroying the germs of putrefaction or suppuration.
Antispasmodic (an-te-spas-mod'ik). Counteracting or curing spasm.
Antisyphilitic (an-te-sif-i-lit'ik). A remedy for the relief of syphilis.
Antitoxin (an-te-toks'ine). Virus used to neutralize the action of toxin.
Anuria (an-u're-ah). An absence or deficiency of urine.
Anus (a'nus). The extremity of the rectum.
Aperient (ah-pe're-ent). Laxative; opening.
Aperture (a'per-tur). An opening or orifice.
Apex (a'peks). The tip, point or summit of anything.
Aphasia (ah-fa'se-ah). A loss of power of speech from cortical lesion.
Aphasia Amnesic (ah-fe'se-ah am-ne'sik). A want of memory for words.
Aphasia Ataxic (ah-fe'se-ah a-taks'ik). An inability to articulate words.
Aphonia (ah-fo'ne-ah). A loss of voice, due to peripheral lesion.
Aphonia Clericorum (ah-fo'ne-ah cler-i-co'rum). Clergymen's sore throat.
Aphthae (af'the). Small white ulcers of the mouth; thrush.
Aphthous (af'thus). Marked by aphthae.
Apis Mellifica (ap'is mel-if'ik-a). The honeybee.
Apnea (ap-ne'ah). Temporary absence of breathing.
Apoplexy (ap'o-pleks-e). Paralysis from rupture of a cerebral vessel.
Apoplexy, Bulbar (ap'o-pleks-e bulb'ar). Due to the rupture of a blood vessel in the medulla oblongata.
Apothecary (a-poth'e-ka-re). A druggist; a seller of drugs.
Apparatus (ap-a-ra'tus). Instruments; a number of organs which act together in the performance of a definite function.
Appendage (ap-pen'dage). That which is attached to an organ as a part of it.
Appendicitis (ap-pen-dis-i'tis). Inflammation of the appendix vermiformis.
Appendix (ap-pen'diks). An appendage; an adjunct.
Approximate (ap-proks'i-mate). To come near to; approaching; closely resembling.
Arabinose (ar'ab-in-os). A pentose; gum sugar from arabic acid.
Arachnitis (ar-ak-ni'tis). Inflammation of the arachnoid membrane.
Arachnoid (ar-ak'noid). Resembling a web.
Arcanum (ar-ka'num). A sweet medicine or nostrum.
Area (a're-ah). Any space with boundaries.
Areola (a-re'o-lah). A ring-like discoloration; colored ring around the nipple.
Areolae (a-re'o-le). The interstices in connective tissue.
Areolar (ar-e'o-lar). Pertaining to the areola; full of interstices.
Aroma (a-rom'ah). Intense perfume; odor.
Aromatic (a-ro-mat'ik). Spicy; fragrant; a spicy, stimulating drug.
Aromatic Powder (a-ro-mat'ik pow'der). A mixture of nutmeg, ginger, cinnamon and cardamona.
Aromatic Tincture (a-ro-mat'ik tinc'ture). An alcoholic solution of aromatic powder.
Arteritis (ar-te-ri'tis). Inflammation of an artery.
Artery (ar'ter-e). A vessel carrying blood from the heart.
Arthritic (ar-thrikt'ik). Relating to inflammation of the joints.
Articulated (ar-tik'u-la-ted). Jointed.
Articulation (ar-tik-u-la'shun). A joint or an arthrosis. The enunciation of words.
Articulatory (ar-tik'u-la-to-re). Pertaining to articulation.
Artificial (ar-ti-fish'al). Made or imitated by art.
Arytenoid (ar-it-e'noid). Cup-shaped or ladle-shaped.
Ascaris (as'kar-is). A genus of parasitic roundworms.
Ascending (as-send-ing). Rising.
Ascending Degeneration (as-send-ing de-jen-er-a'shun). A degeneration of nerve-fibres progressing from the periphery to the centre.
Ascites (as-si'tez). Dropsy of the abdomen.
Asparagin (as-par'a-gin). The organic principle of asparagus.
Asparagus (as-par'a-gus). A genus of plants of the lily family. It is a diuretic.
Aspermous (ah-sper'mus). Without seed.
Asphyxia (as-fiks'e-ah). The condition caused by the nonoxygenation of the blood. Suspended animation.
Aspirate (as'pi-rate). To breathe roughly.
Aspiration (as-pi-ra'shun). Inspiration; inbibition.
Aspirator (as'pir-a-tor). An instrument for extracting fluids from cavities.
Assimilable (as-im'il-a-bl). Capable of being assimilated.
Assimilate (as-im'i-late). To become similar. To perform the act of converting food to the substance of the body.
Assimilation (as-im-il-a'shun). The act of absorbing nutriment. A state of resemblance.
Assumption (as-sump'shun.) The act of taking to oneself; adoption.
Asthenia (as-the'ne-ah). A loss of strength.
Asthenopia (as-then-o'pe-ah). Weak or painful vision.
Asthma (az'mah). Paroxysmal difficult breathing with oppression.
Asthma, cardiac (az'mah kar'di-ak). Difficult breathing due to heart disease.
Asthmatic (az-mat'ik). Subject to asthma.
Astringent (as-trin'jent). An agent producing contraction of organic tissues or the arrest of a discharge.
Atmosphere (at'mus-fer). The air or gaseous mixture surrounding the earth, fifteen pounds to the square inch.
Atomizer (at'o-mi-zer). An instrument for reducing a jet of liquid to a spray.
Atrophia (at-ro'fe-ah). See atrophy.
Atrophy (at'ro-fe). A wasting of a part from a lack of nutrition.
Atropina (at'ro-pin). The active principle of belladonna.
Attar of Rose (ot'ar). Oil of rose.
Attenuated (a-ten'u-a-ted). Wasted; thinned.
Attenuation (a-ten-u-a'shun). A thinning or weakening.
Attic (at'ik). The portion of the tympanum above the atrium.
Auditory (aw'di-to-re). Pertaining to the act or organs of hearing.
Augment (aug'ment). The increase of a disease or the period intervening between its attack and its height.
Auricle (au'rik-l). The external ear. One of the upper cavities of the heart.
Auricular (aw'rik-u-lar). Pertaining to the ear or cardiac auricle.
Auriculoventricular (aw-rik-u-lo-ven-trik'u-lar). Pertaining to both the auricle and ventricle.
Auscultation (aws-kul-ta'shun). A method of determining the condition of an organ by listening to the sounds produced by it.
Autocic (aw-te'sik). Living absolutely on the same organism.

Autopsy (aw'top-se). Examination of a corpse.
Auxilary (awks-il'e-a-re). Aiding; assisting.
Axilla (aks-il'ah). The armpit.
Axillary (aks-il'a-re). Relating to the armpit.

B

Bacillus (bas-il'us). A genus of schizomycetes, the most important group of bacteria.
Bacteria (bak-te're-ah). Micro-organisms; microbes; schizomycetes.
Bacterial (bak-te're-al). Relating to or caused by bacteria.
Bactericidal (bak-te-ris-i'dal). Destroying bacteria.
Bactericide (bak-te'ris-id). See germicide.
Bacteriemia (bak-te-re-e'me-ah). The presence of bacteria in the blood.
Bacterin (bak'ter-in). Any vaccine prepared from a specific bacterium.
Bacterium (bak-te're-um). A genus of fission fungi.
Balsam (bawl'sam). A compound of resin and evaporative oils, fragrant and aromatic.
Balsamic (bawl'sam-ik). Resembling balsam; pertaining to balsam.
Balsamic Tincture (bawl'sam-ik tink-ture). Compound tincture of benzoin.
Barley (bar'le). A cereal used for food.
Barley-water (bar'le-wa'ter). A nutritious drink made of an infusion of barley.
Belladonna (bel-ah-don'ah). A poisonous plant, used as an anodyne; an antispasmodic.
Benignant (be-nig'nant). Not malignant; mild.
Benzoin (be'zoin). An antiseptic resin from styrax benzoin.
Bergamot Camphor, Oil of (ber'gam-ot kam'fer). An evaporative oil from rind of citrus bergamia.
Bergaptene (ber-gap'tene). An oily substance from bergamot oil.
Beriberi (ber'e-ber'e). An East Indian microbic disease characterized by weakness, anemia, dropsy, dyspnea and paraplegia.
Bibulous (bib'u-lus). Having the quality of absorbing water.
Bicapitate (bi-kap'it-at). Having two heads.
Bicapsular (bi-kap'su-lar). Having two capsules.
Bicarbonate (bi-kar'bo-nat). A compound of two equivalents of carbonic acid and one of a base.
Bicaudate (bi-kaw'date). Having two tails.
Bicellular (bi-sel'u-lar). Composed of two cells.
Biceps (bi'seps). Two-headed; applied to muscles.
Bichlorid (bi-klo'rid). A chlorid with twice as much chlorin as proto-chlorid.
Biennial (bi-en'e-al). Occurring every two years.
Biforate (bi-fo'rat). Having two aperatures or pores.
Bifurcate (bi-fer'kat). Divided into two branches.
Bile (bil). A yellow, bitter liquid secreted by the liver.
Biliary (bil'e-a-re). Pertaining to the bile; conveying the bile.
Bilious (bil'yus). Pertaining to bile; having a disordered liver.
Binary (bi'na-re). Compounded of two elements.
Biogenesis (bi-o-gen'e-sis). The genesis of living beings from living beings.
Biologist (bi-ol'o-jist). One versed in biology.
Biology (bi-ol'o-je). The science of life and living things.
Biolysis (bi-ol'i-sis). The destruction of life; death.
Biolytic (bi-o-lit'ik). Tending to destroy life.
Biometer (bi-om'et-er). An instrument for measurng life sounds.
Biometry (bi-om'et-re). The measure of life.
Bioscopy (bi-os'ko-pe). Examination of the body to see if life is extinct.
Bismuth (biz'muth). A pinkish-white crystalline metal.
Blackheads (blak'heds). See comedo.
Bland (bland). Mild; nonirritating.
Blepharal (blef'ar-al). Relating to the eyelids.
Blepharism (blef'ar-ism). Spasm of the eyelid.
Blepharitis (blef-ar-i'tis). Inflammation of the edges of the eyelids.
Blister (blis'ter). A vesicle containing serum.
Blood (blud). The nutritive fluid circulating in the arteries and veins.
Bloodless (blud'les). Without blood.
Bloodless Operation (blud'less op-er-a'shun). One in which the blood is expelled by compresses from the part to be operated on.
Blue Baby (blu ba'be). A color; a baby with blue disease.
Blue Blindness (blu blind'ness). Inability to distinguish a blue color.
Blue Disease (blu dis-ez'). See cyanopathy.
Blue Flag (blu flag). See iris.
Blue Mass (blue mas). A compound pill of mercury.
Blue Ointment (blu oint'ment). Mercurial ointment.
Blue Stone (blu stone). See blue vitriol.
Blue Vision (blu vizh'un). See cyanopia.
Blue Vitriol (blu vit'ri-ol). Sulphate of copper; bluestone.
Body (bod'e). The animal frame with its organs.
Boil (boil). A localized abscess of the skin.
Bole (bol). Fine clay, formerly used as an astringment.
Bolus (bo'lus). A mass of masticated food ready to swallow.
Borax (bor'ax). Sodium diborate used as an antiseptic.
Bovine (bo'vin). Pertaining to or derived from the ox or cow.
Bowel (bow'el). The intestines.
Bowel Complaint (bow'el kom-plant'). Diarrhœa.
Brachia (brak'e-ah). See brachium.
Brachial (brak'e-al). Pertaining to the arm.
Brachium (brak'e-um). The arm from the shoulder to the elbow.
Bronchi (bron'ki). See bronchus.
Bronchia (bron'ke-ah). A branch of the windpipe.
Bronchiole (bron'ke-ol). A minute bronchial tube.
Bronchitis (bron-ki'tis). Inflammation of the bronchial tubes.
Bronchopathy (bron-kop'a-the). Any disease of the bronchi.
Bronchopneumonia (bron-ko-nu-mo'ne-ah). Inflammation of the lungs beginning at the bronchi.
Bronchotomy (bron-kot'o-me). Incision of the bronchus.
Bronchus (bron'kus). One of the main branches of the trachea.
Bruit (bru'e). An abnormal sound in auscultation.
Bubo (bu'bo). An inflammation and a swelling of the lymphatic glands of the groin.
Bugleweed (bu'gl-weed). The herb hycopus virginicus used as a narcotic and as an astringent.
Bulb (bulb). The expansion of a canal or vessel; the oblongata and pons.
Bulimia (bu-lim'e-ah). Excessive, morbid hunger.
Bullate (bul-late). Blistered; inflated.
Bullation (bul-a'shun). Inflation; division into small compartments.
Bursa (bur'sah). A small sac interposed between movable parts.
Bursal (bur'sal). Pertaining to a bursa or sac.
Bursalis (bur-sa'lis). The obturator internus muscle.
Bursitis (bur-si'tis). Inflammation of a bursa.
Butane (bu'tan). An anesthetic substance from petroleum.
Buttock (but'ok). One of the rounded parts of the gluteal region; the rump.

C

Cacao (ka-ka'o). See theobroma.
Cacao Butter (ka-ka'o but'ter). The oil of theobroma.
Cachexia (ka-keks'e-ah). A depraved condition of nutrition.
Calcareous (kal-ka're-us). Having the nature of lime.
Calcination (kal-sin-a'shun). The process of expelling by heat the evaporative elements of a substance.
Calcined (kal'sind). Subjected to calcination.
Calcium (kal'se-um). A metal; the basis of lime.
Calculi (kal'ku-li). Plural of calculus.
Calculus (kal'ku-lus). A stone-like concretion formed in the body.
Calf (kaf). The fleshy part of the leg below the knee.
Calisthenics (kal-is-then'iks). A system of light gymnastics.
Callosum (kal-lo'sum). The bridge of white nerve substance joining the hemisphere of the brain.
Callous (kal'us). Hard; indurated.
Callus (kal'us). A callosity; a new bony deposit about a fracture.
Cancelli (kan-sel'li). The divisions of the interior of bone.
Cancer (kan'ser). See carcinoma.
Canker (kan'ker). A cancerous or gangrenous sore.
Cannabis (kan'na-bis). Hemp; a genus of narcotic, antispasmodic and aphrodisiac plants.
Cantharides (kan-thar'i-dez). The plural of cantharis.
Cantharis (kan'thar-is). Spanish fly; dried and powdered beetle cantharis vesicatoria.
Canthus (kan'thus). A cavity at the extremities of the eyelids; an angle of the eye.
Capillary (kap'il-ar-e). A minute blood vessel, like a hair.
Capsicum (kap'si-kum). Cayenne pepper; a powerful stimulant.
Capsular Ligament (kap'su-lar lig'a-ment). A ligament around a movable joint.
Capsule (kap'sul). A membranous sac inclosing a part.
Carbo Hydrate (kar'bo hi'drate). A compound of carbon with hydrogen and oxygen, the latter being in the proportion to form water.
Carbon (kar'bon). A nonmetal occurring in the forms of diamond, graphite and charcoal, the latter only being used in medicine.
Carbonated (kar'bon-at-ed). Containing or impregnated with carbonic acid.
Carbuncle (kar'kunk-l). A large circumscribed inflammation of the subcutaneous tissue.
Carcinoma (kar-sin-o'mah). A malignant tumor with the production of epithelioid cells; cancer.
Cardia (kar'de-ah). The heart; an orifice of the stomach.
Cardiac (kar'de-ak). Pertaining to the heart or cardia.
Cardiagra (kar-de-a'grah). Gout of the heart.
Cardialgia (kar-de-al'je-ah). Heartburn; pain in the heart.
Cardiocele (kar'de-o-sel). Hernia of the heart.
Cardiology (kar-de-ol'o-je). The science of the heart.
Carminative (kar-min'a-tiv). A medicine expelling flatus.
Carotid (kar-ot'id). The principal artery of the neck.
Carpal (kar'pal). Pertaining to the carpus or wrist.
Carpus (kar'pus). The wrist.
Cartilage (kar'ti-laj). Gristle; a nonvascular elastic tissue, softer than bone.
Cartilaginous (kar-til-aj'in-us). Of the nature of cartilage.
Caruncle (kar'un-kl). A small, fleshy growth.
Catalysis (ka-tal'i-sis). A chemic reaction promoted by the presence of a third unaffected substance. Dissolution; decay; deterioration.
Catamenia (kat-a-me'ne-ah). The menses.
Cataplasm (kat'a-plazm). A poultice.
Catarrh (ka-tar'). Inflammation of the mucous membrane.
Cathartic (ka-thar'tik). A purgative medicine; a medicine which opens the bowels freely.
Catheter (kath'e-ter). A tube for introduction through a narrow canal into a cavity, usually the bladder.
Catheterism (kath'et-er-ism). The use of the catheter.
Cathalicon (kath-ol'i-kon). A panacea; a universal medicine.
Caudate (kaw'dat). Having a tail.
Caudate Lobe (kaw'dat lob). The tail-like process of the liver.
Causalgia (kaw-zal'ge-ah). An intense burning neuralgia.
Causation (kaw-za'shun). The act of causing or producing.
Caustic (kaws'tik). A substance which burns living tissues.
Caustic Arrows (kaws'tik ar'rows). Conic sticks charged with caustic material.
Caustic, Lunar (kaws'tik, lu'nar). Silver nitrate cast into sticks.
Caustic, Mitigated (kaws'tik, mit'i-ga-ted). Silver nitrate fused with potassium nitrate.
Caustic Potash (kaws'tik pot'ash). Potassium hydrate; a powerful potash used in medicine and the arts for cauterizing and cleansing purposes, and in the manufacture of soft soap.
Caustic Soda (kaws'tik so'da). Sodium hydrate; similar in properties and uses to caustic potash, the soaps made with it, however, being hard.
Cauterization (kaw-ter-i-za'shun). The application of a cautery.
Cautery (kaw'ter-e). A substance or instrument for burning or disorganizing a part.
Cavitary (kav'it-a-re). Hollow; having a body-cavity or intestinal tract.
Cecum (se'kum). The blind pouch at the head of the large intestine.
Cellular (sel'u-lar). Composed of cells.
Cellulose (sel'u-los). The supporting structure or frame work of plant tissue.
Cephalalgia (sef-al-al'je-ah). Pain in the head.
Cephalic (sef-al'ik). Pertaining to the head.
Cera (se'rah). Wax.
Cerate (se'rate). A composition having wax for a basis.
Ceratum (se-ra'tum). A cerate.
Cerebellum (ser-e-bel'lum). The lower part of the brain.
Cerebral (ser'e-bral). Relating to the brain.
Cerebritis (ser-e-bri'tis). Cerebral inflammation.
Cerebrosid (ser'e-bro-sid). Any one of the group of chemic substances containing nitrogen but no phosphorus, found in nerve tissue.
Cerebrospinal (ser-e-bro-spi'nal). Relating to the brain and spine.
Cerebrum (ser'e-brum). The chief part of the brain; the center of reasoning faculties.
Cerumen (se-ru'men). The wax or yellow matter secreted by the ear.
Cervical (ser'vi-kal). Pertaining to the neck or to a cervix.
Cervix (ser'viks). The neck; any neck-like part.
Cessation (ces-sa'shun). To stop; to rest; to pause; ceasing from action.
Cesspool (ses'pool). A hole sunk in the earth to receive drainage.

Cevadin (sev'ad-in). An alkaloid from sabadilla.
Chalybeate (ka-lib'e-at). Any water or liquid containing iron.
Chancre (shang'ker). The primary or hard syphilitic ulcer.
Chancroid (shang'kroid). Resembling a chancre.
Chancrous (shang'krous). Of the nature of a chancre.
Charcoal (char'kol). Coal produced from wood by smothered combustion.
Charlatan (shar'la-tan). A quack.
Charlatanry (shar'lat-an-re). Quackery.
Chemical (kem'i-kal). Pertaining to chemistry. See chemistry.
Chemistry (kem'is-tre). The science of the molecular and atomic structure of bodies.
Chilblain (chil'blan). Cutaneous inflammation due to cold.
Chloretone (klo're-ton). A white crystalline substance used as a hypnotic and local anesthetic.
Chlorin (klo'rin). A nonmetallic gaseous element.
Chlorinated (klo'rin-a-ted). Charged with chlorin. See chlorin.
Chlorite (klo'rit). A salt of chlorous acid.
Cholagog (kol'ag-og). A medicine that promotes the flow of bile.
Cholagogue (kol'ag-og). Same as cholagog.
Choleric (kol'er-ic). Abounding with bile. Easily irritated.
Chondroma (kon-dro'mah). A cartilaginous tumor.
Chorea (ko-re'ah). Saint Vitus's dance; involuntary muscular twitchings.
Choreoid (ko're-oid). Pertaining or similar to chorea.
Chorioid (ko're-oid). See choroid.
Choroid (ko'roid). The second or vascular tunic of the eye.
Choroiditis (ko-roid-i'tis). Inflammation of the choroid.
Chromium (kro'me-um). A hard, gray, metallic element.
Chronic (kron'ik). Long continued; the reverse of acute.
Chyle (kil). The milky fluid found in the mesenteric lymph-vessels during absorption.
Chylopoietic (ki-lo-poi-et'ik). Chyle-producing.
Chyme (kim). The food that has undergone gastric but not intestinal digestion.
Cicatrix (se-ka'trix). A scar from a wound.
Cicatrization (sik-a-triz-a'shun). The process of healing.
Cicatrize (sik'a-triz). To heal.
Cilia (sil'e-ah). The eyelashes; hair-like processes of certain cells.
Ciliary (sil'e-a-re). Pertaining to the cilia.
Ciliary Body (sil'e-a-re bod'e). The ciliary muscle and processes.
Cinchona (sin-ko'nah). A genus of trees and their bark yielding quinin.
Cinchonism (sin'kon-ism). The systemic effects of quinin in overdose.
Circumscribed (ser'kum-skribed). Clearly defined, as an abscess.
Citrate (si'trate). A salt of citric acid.
Citrus (sit'rus). A genus of trees yielding lemons, limes, and oranges.
Clarificant (klar'if-ik-ant). A substance for clearing a solution.
Clarified (klar'i-fied). To purify; to make clear.
Clavicle (klav'i-kel). The collar-bone joining the sternum and scapula.
Climacteric (kli-mak'ter-ik). A critical period in human life or a period in which some great change is supposed to take place in the human constitution.
Clinic (klin'ik). Bedside instruction.
Clinical (klin'ik-al). Pertaining to a sick-bed or clinic.
Clonic (klon'ik). Shaking; convulsive; irregular.
Clyster (klis'ter). A rectal injection; an enema.
Coagulate (ko-ag'u-late). To change from a liquid to a denser state.
Coagulation (ko-ag-u-la'shun). A clotting.
Coagulum (ko-ag'u-lum). A clot or mass of thickened blood.
Coalesce (ko-a-les'). To grow together; to unite as separate bodies, or separate parts into one body.
Coalescence (ko-al-es'ens). The union of two or more parts.
Coaptation (ko-ap-ta'shun). The adjustment of the edges of fractures.
Cocain (ko'kan). An alkaloid from coca; it is a powerful local anesthetic and internally is used as a narcotic.
Coccus (kok'us). A cell or capsule.
Coccyx (kok'siks). The last bone of the spinal column.
Cochineal (coch'i-neal). Coccus cacti; dried insects used as coloring matter.
Cocoa (ko'ko). See cacao. A name given to a simple preparation of the ground kernels of the cacao or chocolate-tree.
Coco-nut Oil (ko'ko-nut oil). The oil from the fruit of the palm.
Codein (ko'de-in). One of the alkaloids derived from opium.
Coil (koil). A spiral.
Coil Gland (koil gland). A sweat gland.
Colchicum Autumnale (kol'chick-um au-tum'nal). Meadow saffron. It is an emetic and drastic cathartic. It is used in gout and in rheumatic affections.
Cold (kold). Coryza; catarrh of the respiratory tract.
Collapse (kol-laps'). A marked depression of the vital activities of the body.
Colliquative (kol-lik'wa-tiv). Profuse or excessive, so as to cause exhaustion; said of the discharges, as a colliquative sweat.
Collision (kol-li'shun). The coming together of two bodies; a concussion.
Collodion (kol-o'de-on). Same as collodium.
Collodium (kol-o'de-om). A dressing for wounds, made by dissolving gun-cotton in ether and alcohol.
Colloid (kol'oid). Glue-like; a noncrystallizable organic substance.
Colloid Cancer (kol'oid kan'ser). Carcinoma with colloid degeneration.
Colloid Cyst (kol'oid cist). A cyst with jelly-like contents.
Colloma (kol-o'mah). A cyst containing colloid matter.
Collum (kol'um). The neck.
Collutorium (kol-u-to're-um). A mouth wash; a gargle.
Collyrium (kol-ir'e-um). A medical lotion for the eyes.
Coloboma (kol-o-bo'mah). A fissure, especially of parts of the eye.
Colocentesis (ko-lo-sen-ti'sis). Surgical puncture of the colon.
Coloenteritis (ko-lo-en-ter-i'tis). Inflammation of the small and large intestines.
Colon (ko'lon). The part of the large intestine from the cecum to the rectum.
Coma (ko'mah). An abnormally deep sleep; stupor.
Comatose (ko'ma-tos). In a condition of coma.
Combustion (kom-bus'chun). The state or operation of burning.
Comedo (kom'e-do). Blackhead; a worm-like mass in an obstructed sebaceous duct.
Comminution (kom-min-u'shun). The process of breaking into pieces.
Commiphora (kom-if'o-rah). The genus of trees furnishing myrrh and balm of Gilead.

Commissure (kom'mis-ur). A joining or uniting.
Compensation (kom-pen-sa'shun). The state of counterbalancing a defect of structure or function.
Complemental Air (kom-ple-men'tal air). That inhaled after ordinary breathing.
Complexus (kom-pleks'us). The totality of the symptoms of a disease.
Complication (kom-pli-ka'shun). A combination of diseases or morbid conditions.
Compress (kom'pres). Folded cloths for local pressure.
Compression (kom-presh'un). The forcing together of a substance.
Conarium (ko-na're-um). The pineal gland of the brain.
Concave (kon'kav). Presenting a hollowing incurvation.
Concavity (kon-kav'i-te). A depression or fossa.
Concentrated (kon'sen-tra-ted). Made stronger or purer.
Concentric (kon-sen'trik). Having a common center.
Conception (kon-sep'shun). The fecundation of the ovum.
Conception Imperative (kon-sep'shun im-per'a-tiv). A false idea dominating an insane person's actions.
Concoction (kon-kok'shun). The boiling of two substances together.
Concomitant (kom-kom'it-ant). Accompanying, as symptoms.
Concrete (kon-kret'). Solidified or condensed.
Concretion (kon-kre'shun). A calculus; an osseous deposit; abnormal union of adjacent parts.
Concussion (kon-kush'un). A shaking.
Concussion of the Brain (kon-kush-un). Shock or agitation of the brain caused by impact with another body.
Condiment (kon'di-ment). Seasoning; sauce; that which is used to give relish to meat or other food.
Conductive (kon-duk'tiv). Having the power to conduct.
Conductivity (kon-duk-tiv'i-te). The capacity for conducting.
Conductor (kon-duk'tor). An instrument directing a surgical knife.
Conduit (kon'dit). Any medium of transmission as the nerves and blood vessels.
Condyle (kon'dil). Any rounded prominence, such as occurs in the joints of many bones especially the femur, humerus and lower jaw.
Confection (kon-fek'shun). A sweet excipient in pharmacy.
Confinement (kon-fin'ment). The period of parturition.
Congelation (kon-jel'a-shun). A freezing; frostbite.
Congenital (kon-jen'i-tal). Existing from birth, innate.
Congestion (kon-jes'chun). An excessive accumulation of blood in an organ with disorder of its functions.
Conium Maculatum (kon-i'um mak-u-la'tum). Poison hemlock. The leaves and seeds are sedative and narcotic.
Conjugation (kon-ju-ga'shun). A form of reproduction or cell division.
Conjugation Nucleus (kon-ju-ga'shun nu'kle-us). The segmentation-nucleus.
Conjunctiva (kon-junk-ti'vah). The mucous membrane of the eye.
Conjunctivitis (kon-junk-tiv-i'tis). Inflammation of the conjunctiva.
Conserve (kon-serv'). A confection.
Consistence (kon-sis'tens). The degree of density or hardness.
Constipation (kon-sti-pa'shun). A sluggish action of the bowels.
Constitution (kon-sti-tu'shun). Composition; the general temperament of the body.
Constrict (kon-strikt'). To draw together in one part.
Constrictor (kon-strik'tor.) A contracting or compressing muscle.
Contagion (kon-ta'jun). The process of transfer of specific diseases. The act of taking a disease by contact.
Contagious (kon-ta'jus). Having the character of contagion.
Contagium (kon-ta'je-um). Germs of specific diseases. Contagion.
Contamination (kon-tam-i-na'shun). The act of polluting; pollution; defilement; taint.
Contiguity (kon-tig-u'i-te). Actual contact.
Continuity (kon-tin-u'i-te). Uninterrupted connection.
Contorted (kon-tor'ted). Twisted.
Contortion (kon-tor'shun). A twisting or wresting of a limb or member of the body out of its natural situation.
Contract (kon-trakt'). To draw the parts together; to shrink; to acquire by contagion.
Contractile (kon-trak'til). Having the power to contract.
Contraction (kon-trak'shun). Decrease of volume; shortening.
Contracture (kon-trak'chur). A state of permanent rigidity.
Contuse (kon-tuz'). To bruise.
Contusion (kon-tu'zhun). A bruise.
Convalescence (kon-va-les'ence). The period of recovery after a disease.
Convergence (kon-ver'gens). A coming together.
Convex (kon'veks). Curved outward on the external surface.
Convoluted (kon'vo-lu-ted). Rolled one part on another.
Convolution (kon-vo-lu'shun). A fold, twist or coil of any organ.
Convulsion (kon-vul'shun). A violent involuntary contraction; a spasm or fit.
Co-ossify (ko-os'si-fi). To become united by ossification; to form one bone; as, several bony elements co-ossify in man to form the sphenoid bone.
Copious (ko'pi-us). Abundant; plentiful; in great quantities.
Coracoid (kor'ak-oid). Shaped like a crow's beak.
Cordial (kor'jal). An aromatic, spirituous stimulant.
Coriaceous (kor-ri-a'shus). Leather-like; elastic and tough.
Corm (korm). A bulb-like, solid, fleshy subteranean stem. A colony of persons.
Corn (korn). A local thickening and induration of the skin, as on the toes.
Cornea (kor'ne-ah). The transparent anterior part of the eyeball.
Corneal (kor'ne-al). Pertaining to the cornea.
Corneoritis (kor-ne-o-ri'tis). Inflammation of both cornea and iris.
Cornu (kor'nu). A horn-shaped structure.
Coronary (kor'o-na-re). Encircling, as a vessel or nerve.
Coroner (kor'o-ner). An officer who holds inquests on those dead from violence.
Corpora (kor'po-rah). Plural of corpus. Human bodies, living or dead.
Corporeal (kor-po're-al). Having a body; consisting of material substance.
Corpulency (kor'pu-len-se). Obesity; largeness of the body; fleshiness.
Corpus (kor'pus). A body; the human body.
Corpuscle (kor'pus-l). A minute body; a cell.
Corrective (kor-rek'tiv). A substance modifying the action of drugs.
Correlation (kor-re-la'shun). Interdependence; reciprocal relation.

Corroborant (kor-ob'o-rant). A tonic, invigorating remedy.
Corroborative (kor-ob'o-ra-tiv). A medicine that strengthens; a corroborant.
Corrosive (kor-o'siv). A substance that eats away or destroys.
Cortex (kor'teks). The external gray layer of the brain.
Cortical (kor'tik-al). Pertaining to the cortex.
Cortical Cataract (kor'tik-al kat'a-ract). Opacity in the cortex of the lens.
Cosmetic (kos-met'ik). Making beautiful; a remedy for beautifying the skin.
Cosmetic Operation (kos-met'ik op-er-a'shun). An operation for lessening unsightliness.
Cosmolin (koz'mo-lin). See petrolatum.
Costal (kos'tal). Pertaining to the ribs.
Costal Cartilage (kos'tal kar'ti-laj). The anterior cartilaginous extremity of a rib.
Costal Respiration (kos'tal res-pi-ra'shun). Respiration carried on chiefly by the chest muscles.
Costive (kos'tiv). Affected with constipation.
Costiveness (kos'tiv-nes). Abnormality of digestion marked by hardness and retentention of the discharge of the bowels.
Counter-irritant (koun'ter-er'ri-tant). A medicine which relieves irritation in one organ by increasing it in another.
Cranial (kra'ne-al). Pertaining to the skull.
Cranium (kra'ne-um). The skull; the bony case of the brain.
Crassamentum (kras-a-men'tum). A clot, as of blood.
Crepitus Indux (krep'i-tus in'dux). The crackling rale heard at the beginning of croupous pneumonia.
Crepitus Redux (krep'i-tus re'dux). A crackling rale indicating the recession of pneumonia.
Crescent (kres'ent). Having the shape of a new moon.
Crescentic (kres-en'tik). Moon-shaped.
Cresol (kre'sol). Cresylic acid, a coal-tar product.
Cretin (kre'tin). One affected with cretinism.
Cretinism (kre'tin-ism). The condition of a cretin. An endemic disease characterized by idiocy, goiter and a deficient development of the organism.
Crisis (kri'sis). The turning point in a disease.
Crude (krud). In the natural form; raw.
Crus (krus). The leg; a leg-like structure.
Crypt (kript). A small sac or follicle; a glandular cavity.
Cryptogram (krip'to-gram). A flowerless plant.
Cryptitus (krip-ti'tis). Inflammation of a crypt.
Crystals (kris'tals). Solid substances of definite geometric form, resulting from the action of natural forces.
Crystalline (kris'tal-en). Like a crystal.
Curd (kurd). The coagulum of milk.
Cutaneous (ku-ta'ne-us). Pertaining to the skin.
Cuticle (ku'ti-kl). The epidermis or scarf skin.
Cutis (ku'tis). The derma or true skin.
Cutization (ku-tiz'a-shun). A change into dermic tissue.
Cyanopathy (si-an-op'a-the). See cyanosis.
Cyanopia (si-an-o'pe-ah). A perverted state of the vision rendering all objects blue.
Cyanopsia (si-an-op'se-ah). See cyanopia.
Cyanosis (si-an-o'sis). Blue discoloration of skin from nonoxidation of blood.
Cyanotic (si-an-ot'ik). Pertaining to cyanosis.
Cyclotomy (si-klot'o-me). An operation for the relief of glaucoma consisting of an incision through the ciliary body.
Cynanche (sin-an'ke). An inflammatory disease of the throat.
Cyst (sist). A membranous sac containing fluid.
Cysticus (sis'tik-us). Any one member of a family of tapeworms which in the course of development form the cysticercus or bladder-worm.
Cystitus (sis-ti'tis). Inflammation of the bladder.

D

Debauch (de-boch'). Excess in eating or drinking. Intemperance.
Debilitant (de-bil'it-ant). An agent allaying excitement.
Debilitated (de-bil'i-tated). To weaken; to impair the strength of.
Debility (de-bil'i-te). Weakness; feebleness; languor of body.
Deciduous (de-sid'u-us). Shedding; falling; not perennial or permanent.
Decoction (de-kok'shun). Result obtained by boiling substances in a fluid.
Decomposition (de-kom-po-zish'un). Putrefaction; the analysis of a body.
Decrepitude (de-krep'i-tude). The broken state of the body, produced by decay and the infirmities of age.
Decubital (de-ku'bit-al). Relating to a bed-sore or to decubitus.
Defecation (def-e-ka'shun). The evacuation of the bowels.
Defect (de-fekt'). An imperfection; an absence of a part or organ.
Defervescence (de-fer-ves'ens). Abatement or decrease of a fever.
Deformity (de-for'mi-te). Physical malformation or distortion.
Degeneration (de-jen-er-a'shun). Deterioration in structure of a tissue or an organ.
Deglutition (deg-lu-tish'un). The act or power of swallowing.
Dejection (de-jek'shun). Discharge of the bowels.
Deleterious (del-e-te'ri-ous). Injurious; pernicious; unwholesome.
Deliquescent (del-i-ques'ent). Liquefying from absorption of atmospheric moisture.
Delirium (de-lir'e-um). Mental aberration due to disease; wandering of the mind.
Delta Fornices (del'ta for'ni-ces). See lyra fornices.
Deltoid (del'toid). Delta shaped; a muscle of the shoulder.
Delusion (de-lu'shun). A false judgment of objective things.
Demarcation (de-mar-ka'shun). The act of marking the limits of; separation, as into a class.
Demented (de-men'ted). Deprived of reason.
Dementia (de-men'she-ah). Profound mental incapacity.
Demulcent (de-mul'sent). A medicine having a soothing effect.
Dentin (den'tin). The bony structure of the teeth.
Dentition (den-tish'un). The cutting of the teeth and the period of the same.
Deobstruent (de-ob'stru-ent). A medicine having the power of removing obstructions from the passages of the body.
Deplete (de-plet'). To empty.
Depression (de-presh'un). A hollow or fossa; a depressed condition.
Deprivation (dep-ri-va'shun). The act of depriving; a taking away.
Depuration (dep-u-ra'shun). Cleansing from impurities.
Derangement (de-ranj'ment). Disorder of intellect; insanity.
Dermalgia (der-mal'je-ah). Neuralgia of the skin.
Dermic (der'mik). Pertaining to the skin.
Dermopathy (der-mop'a-the). Any disease of the skin.

Desiccate (des'i-kate). To become dry.
Despumation (des-pu-ma'shun). The formation of froth.
Desquamation (des-kwam-a'shun). Scaling of the cuticle.
Detergent (de-ter'jent). Cleansing; purging.
Deteriorate (de-te'ri-o-rate). To grow worse; to be impaired in quality; to degenerate.
Deterioration (de-te-ri-o-ra'shun). The state of growing worse.
Determination (de-ter-min-a'shun). Tendency to flow to; more plentiful than is normal.
Detritus (de-tri'tus). Waste matter from disorganization.
Dexter (deks'ter). Upon the right side.
Dextral (deks'tral). Pertaining to the right side.
Diabetes (di-a-be'tes). A disease characterized by an excessive flow of urine.
Diabetic (di-a-bet'ik). One affected with diabetes.
Diabetid (di-a-be'ted). A cutaneous manifestation of diabetes.
Diacetate (di-as'et-at). A salt of diacetic acid.
Diagnosis (di-ag-no'sis). The recognition of a disease from its symptoms.
Diaphoresis (di-a-for-e'sis). The production of perspiration.
Diaphoretic (di-a-fo-ret'ik). An agent producing perspiration.
Diaphragm (di'a-fram). The muscular wall between the thorax and the abdomen.
Diarrhea (di-a-re'ah). Frequent evacuation of the bowels.
Diarrhœa (di-a-re'ah). See diarrhea.
Diarthrosis (di-ar-thro'sis). A freely movable articulation.
Diastase (di'a-stase). A nitrogenous ferment in malt.
Diastole (di-as'tole). The period of dilatation of the heart.
Diathesis (di-a-the'sis). A constitutional predisposition to disease.
Dicrotic (di-krot'ik). Double-beating, as observed in certain pathologic conditions of the pulse.
Diet (di'et). Food; a system of aliment.
Dietetic (di-e-tet'ik). Pertaining to diet.
Dietetical (di-e-tet'i-kal). Rules for regulating the kind and quantity of food to be eaten.
Differentiate (dif-fer-en'shi-ate). To become specifically distinct and separate.
Differentiation (dif-fer-en-shi-a'shun). A specialization of tissues, organs or functions.
Diffusible (dif-fu'zi-ble). Capable of rapid spreading.
Diffuse (dif-fuze). To scatter or spread about.
Digestion (di-jes'shun). Conversion of food into chyme and chyle.
Dilatation (dil-a-ta'shun). An expansion of a vessel or an organ.
Diluent (dil'u-ent). A medicine increasing the fluidity of secretions.
Dilution (di-lu'shun). A weakening with water.
Diminution (dim-i-nu'shun). The act of lessening; a making smaller.
Dinus (di'nus). Vertigo or dizziness.
Dioxid (di-oks'id). A compound containing two atoms of oxygen and one of a base.
Diploe (dip'lo-e). The cellular bony tissue between the cranial tables.
Discharge (dis-charj'). A morbid secretion; an evacuation.
Discrete (dis-kret'). Separate; distinct; opposed to confluent.
Discutient (dis-ku'shent). A medicine removing a swelling or effusion.
Disease (diz-ez'). A pathologic condition of any part or organ of the body.
Disinfect (dis-in-fekt'). To free from infectiousness.
Disinfectant (dis-in-fek'tant). An agent destroying germs.
Disinfection (dis-in-fek'shun). Purification from that which infects.
Disintegrate (dis-in'te-grate). To fall to pieces; to crumble.
Dislocation (dis-lo-ka'shun). Throwing out of the natural position.
Dispensation (dis-pen-sa'shun). Distribution; the act of dealing out to different persons or places.
Disseminated (dis-sem'i-na-ted). Scattered.
Dissemination (dis-sem-i-na'shun). A scattering as of disease germs.
Distal (dis'tal). Peripheral; away from the center.
Distended (dis-tend'ed). A stretch or spread in all directions.
Distension (dis-ten'shun). A stretching and expanding.
Distillate (dis'til-at). The substance distilled over.
Distillation (dis-til-la'shun). The process of converting a fluid to a vapor and then reducing it again to its first form.
Diuresis (di-u-re'sis). An excessive secretion of urine.
Diuretic (di-u-ret'ik). A medicine increasing the flow of urine.
Divergence (di-ver'gens). The act or state of receding from each other.
Diverticulum (di-ver-tik'u-lum). A small culde-sac or pouch.
Dolomite (dol'o-mite). A granular magnesian carbonite of lime.
Dolomitic (dol-o-mit'ik). Pertaining to dolomite.
Domestic (do-mes'tik). Belonging to the home.
Dorsal (dor'sal). Pertaining to the back.
Dosage (do-saj). The regulating of the doses of drugs.
Douche (doosh). A stream of water directed against a part or one used to flush a cavity.
Dover's Powder (do'vers pow'der). A powder containing ten per cent. each of opium and ipecac.
Drachm or Dram (dram). A weight of sixty grains.
Draft (draft). A quantity of liquid medicine taken at one time.
Dram (dram). A weight of sixty grains.
Drastic (dras'tik). A powerful and irritating purgative.
Draught or Draft. See draft.
Dropsical (drop'si-kal). Pertaining to dropsy.
Dropsy (drop'si). An effusion of fluid into the tissues or cavities of the body.
Duodenum (du-o-de'num). The first part of the small intestines.
Dura or Dura Mater (du-rah ma'ter). The outer membrane of the brain and spinal cord.
Duration (du-ra'shun). Continuance in time.
Dysaphe (dis'a-fe). Disordered sense of touch.
Dysbasia (dis-ba'ze-ah). Difficulty in walking.
Dysecoia (dis-e-koi'ah). Subnormal acuteness of hearing.
Dysentery (dis'en-ter-e). Inflammation and ulceration of the intestinal mucous membrane with bloody evacuations.
Dysgraphia (dis-graf'e-ah). An inability to write properly.
Dyslalia (dis-la'le-ah). A structural defect of speech; stuttering.
Dyslogia (dis-lo'je-ah). An inability to reason.
Dysmenorrhea (dis-men-o-re'ah). Painful menstruation.
Dysneuria (dis-nu're-ah). An impairment of nerve function.
Dysopia (dis-o'pe-ah). Same as dysopsia.
Dysopsia (dis-op'se-ah). Painful or defective vision.
Dyspepsia (dis-pep'se-ah). Impaired or imperfect digestion.

Dyspeptic (dis-pep'tik). Pertaining to or affected with dyspepsia.
Dysphoria (dis-fo're-ah). Restlessness.
Dysphrasia (dis-fra'ze-ah). Imperfect speech.
Dyspnea (disp-ne'ah). Difficult or labored breathing.
Dysuria (dis-u're-ah). Difficulty in discharging the urine attended with pain and a sensation of heat.

E

Ecchymosis (ek-che-mo'sis). A bruise showing on the skin; a black and blue spot.
Echinococcus (e-ki-no-kok'kus). A parasitic larva to a tapeworm peculiar to the dog, but found in other animals and in man, where it produces fatal tumors in the lungs and liver.
Ecstasy (eks'ta-se). Excessive excitement; loss of mental control.
Ectoderm (ek'to-derm). An outer layer or membrane, as the epidermal layer of the skin.
Ectopia (ek-to'pe-ah). An abnormality of position, usually congenital.
Ectopic (ek-top'ik). Pertaining to ectopia.
Eczema (ek'ze-mah). Inflammation of the skin with exudation of lymph.
Edema (e-de'mah). Accumulation of serum in the cellular tissue.
Edematous (e-dem'a-tus). Relating to or marked by edema.
Effeminate (ef-fem'i-nate). Having the qualities of the female sex.
Effervescent (ef-fer-ves'ent). Gently boiling or bubbling by means of the disengagement of gas.
Effete (ef-fete'). Barren; not capable of producing, as an animal, soil, etc.
Efficacious (ef-fi-ka'shush). Producing the effect intended.
Efflorescence (ef-flo-re'sens). Redness of the skin; rash.
Effluvium (ef-flu've-um). Exhalation; vapor; odor.
Effusion (ef-fu'shun). Escape of fluid into body tissues or cavities.
Efflux (ef'flux). To run or flow away.
Ejection (e-jek'shun). The process of casting out.
Elaterium (el-a-te'ri-um). A cathartic substance obtained from the fruit of the squirting cucumber.
Electuary (e-lek'tu-a-re). A medicine whose ingredients are mixed with a syrup.
Elephantiasis (el-e-fan-ti'a-sis). A chronic edematous disease of the skin with hypertrophy of the cellular tissue.
Elimination (e-lim-i-na'shun). The act of discharging by the pores; excretion.
Elongation (e-lon-ga'shun). An imperfect laxation occasioned by the stretching or lengthening of the ligaments.
Emaciation (e-ma-she-a'shun). A loss of flesh; leanness.
Emanation (em-a-na'shun). An effluvium; that which proceeds from a body.
Embolism (em'bol-ism). The obstruction of a blood vessel by an embolus.
Embolus (em'bo-lus). A blood-clot or other body carried by the blood current and obstructing circulation at the point of lodgment.
Emesis (em'e-sis). The act of vomiting.
Emetic (e-met'ik). An agent causing vomiting.
Eminence (em'i-nence). Elevation or height; a rising ground.
Emmenagogue (em-men'a-gog). A medicine which promotes the menstrual flow.
Emollient (e-mol'yent). An agent that softens tissues.
Emphysema (em-fi-se'mah). A swelling produced by air in the tissues.
Empirical (em-pir'ik-al). Known by experience; derived from experiment; used and applied without science.
Empyema (em-pi-e'mah). Pus in the pleural cavity.
Empyreuma (em-pi-ru'ma). Burnt smell; the odor of animal or vegetable substances when burned in close vessels.
Empyreumatic (em-pi-ru-mat'ik). Pertaining to empyreuma.
Emulsion (e-mul'shun). A milky fluid obtained by suspending oil in water.
Encephalic (en-se-fal'ik). Pertaining to the brain.
Encephalon (en-sef'a-lon). The brain.
Endemic (en-dem'ik). A disease peculiar to a people or nation.
Endermatic (en-der-mat'ik). Relating to a method of administering medicines through the skin by rubbing.
Endermic (en-der'mik). See endermatic.
Endocarditis (en-do-kar-di'tis). Inflammation of the lining membrane of the heart.
Endocardium (en-do-kar'di-um). The transparent lining membrane of the heart.
Enema (en'e-mah). A rectal injection of medicine or food.
Energetic (en-er-jet'ik). Forcible; powerful; efficacious.
Energy (en'er-je). The power of doing work.
Engender (en-jen'der). To produce; to cause to exist.
Engorgement (en-gorj'ment). Vascular congestion.
Enteric (en-ter'ik). Pertaining to the intestine.
Enteritis (en-ter-i'tis). Inflammation of the intestines.
Environment (en-vi'ron-ment). The aggregate of surrounding influences.
Ephemera (e-fem'e-rah). A fever of one day's continuance only.
Epidemic (ep-i-dem'ik). A prevailing disease among a people or nation.
Epidermis (ep-e-der'mis). The outer layer of the skin.
Epigastrium (ep-e-gas'tre-um). The region over the stomach.
Epiglottis (ep-e-glot'is). A thin cartilaginous plate over the larynx.
Epiglottitis (ep-e-glot-i'tis). Inflammation of the epiglottis.
Epilepsy (ep'il-ep-se). A nervous disease with loss of consciousness and tonic and clonic convulsions.
Epileptiform (ep-il-ep'ti-form). Resembling epilepsy.
Epilose (ep'i-los). Without hair; bald.
Epispastic (ep-i-spas'tik). A blister.
Epistaxis (ep-is-taks'is). Hemorrhage from the nose.
Epithelial (ep-ith-e'le-al). Pertaining to epithelium.
Epithelium (ep-ith-e'le-um). The cells covering all cutaneous and mucous surfaces together with the secreting cells of glands developed from ectoderm.
Epizootic (ep-e-zo-ot'ik). An epidemic among animals.
Epoch (ep'ock). Any fixed time or period.
Epulis (ep-u'lis). A small, elastic tumor of the gums.
Ergot (er'got). A fungus parasitic upon rye.
Ergotin (er'go-tin). A name for various active extracts of ergot.
Erigeron (e-rig'e-ron). A genus of herbs.
Erosin (e-ro'shun). Ulceration; an eating or wearing away.
Eructation (e-ruk-ta'shun). Belching.
Eruption (e-rup'shun). A breaking out, as in a skin disease.

Eruptive (e-rup'tiv). Characterized by a rash or an eruption.
Erysipelas (er-i-sip'e-las). An acute specific inflammation of the skin and subcutaneous tissues, accompanied by fever and constitutional disturbances.
Erysipelatous (er-i-si-pel'a-tus). Pertaining to erysipelas.
Erythema (er-ith-e'mah). A superficial blush or redness of the skin.
Eschar (es'kar). A dry slough or crust of dead tissue.
Escharotic (es-kar-ot'ik). A substance producing an eschar.
Esophagus (e-sof-a-gus). Canal from the pharynx to the stomach.
Essence (es-ens). The inherent qualities of a drug.
Ester (es'ter). A compound ether containing both an acid and an alcohol radicle.
Ether (e'ther). The subtle fluid filling all space. It is an anesthetic.
Etiology (et-e-ol'o-je). The science of the causes of disease.
Eustachian Artery (u-sta'ke-an ar'ter-e). A branch of the vidian artery.
Evacuant (e-vak'u-ant). A medicine which causes evacuations of the bowels.
Evacuation (e-vak-u-a'shun). Defecation; the act of emptying or clearing the contents.
Evaporate (e-vap'o-rate). To convert from a solid or liquid state into vapor.
Evaporation (e-vap-o-ra'shun). A turning into vapor.
Evince (e-vince'). To manifest; to make evident.
Evolution (ev-o-lu'shun). The process of developing from a simple to a complex, specified, perfect form.
Evulsion (e-vul'shun). A forcible tearing away of a part.
Exacerbation (eks-as-er-ba'shun). Increased severity of symptoms.
Exaggerated (eks-a'ger-a-ted). Enlarged; unduly increased.
Exanthem or Exanthema (eks-an'them). An eruption of the skin.
Exanthematous (eks-an-them'a-tus). Pertaining to an exanthem.
Excipient (eks-sip'e-ent). Any substance combined with an active drug to give the latter an agreeable or convenient form.
Excitant (eks-si'tant). A medicine which arouses the vital activity of the body.
Exclusion (eks-klu'shun). A shutting out; the state of being excluded.
Excoriation (eks-ko-re-a'shun). A wound of the skin caused by rubbing.
Excrement (eks'kre-ment). The feces.
Excrementitious (eks-kre-men-tish'us). Pertaining to the feces.
Excrescence (eks-kres'cence). An abnormal outgrowth on the body; as a wart.
Excreta (eks-kre'tah). The natural discharges of the body.
Excrete (eks-kret'). To throw off effete material.
Excretion (eks-kre'shun). The discharge of the waste products of the body.
Excretory (eks'kre-to-re). Pertaining to excretion.
Excruciating (eks-kru'si-a-ting). Torturing; tormenting; most severe pain.
Exertion (ex-er'shun). The act of putting into motion; effort; a striving or struggling.
Exfoliation (eks-fo-le-a'shun). The scaling off of dead tissue.
Exhalation (eks-hal-a'shun). The vapor given off by the body.
Exhaustion (eks-aws'chun). Great loss of vital power.
Exhilarant (eks-il'a-rant). An agent enlivening the mind.
Exhilarating (eks-il'a-rat-ing). Enlivening; giving life and vigor to the spirit.
Exhumation (eks-hu-ma'shun). Disinterment of a corpse.
Exostosis (eks-os-to'sis). An abnormal outgrowth of a bone.
Expectorant (eks-pek'to-rant). A medicine promoting a secretion of bronchial mucous.
Expectoration (eks-pek-to-ra'shun). The expulsion of the secretions from the chest.
Expiration (eks-pi-ra'shun). The act of breathing out; conclusion; end; close.
Exsiccation (eks-sik-ka'shun). The process of drying by heat.
Extensor (eks-ten'sor). A muscle which causes extension of a part.
Exterminator (eks-ter'min-a-tor). That which destroys.
External (eks-ter'nal). Outer.
Extravasation (eks-tra-va-sa'shun). An effusion of fluid into the tissues.
Extremity (eks-trem'i-te). A limb; an end or a termination.
Exudation (eks-u-da'shun). A morbid oozing out of fluids; sweating.

F

Facial (fa'shal). Pertaining to the face.
Facies (fa'she-ez). The countenance.
Facultative (fak'ul-ta-tive). Pertaining to functional or acquired power.
Faculty (fak'ul-te). Specific power. The corps of professors in a college.
Faradic (far-ad'ik). Pertaining to induced electric currents.
Faradization (far-a-di-za'shun). The treatment of a nerve with faradic or induced currents of electricity.
Farina (far-e'nah). The powdered starch of grain.
Farinaceous (far-in-a'she-us). Having the nature of farina.
Fascia (fash'e-a). A thin covering of the muscles.
Fascination (fas-in-a'shun). Inexplicable or hypnotic influence.
Faucet (faw'set). A fixture for drawing liquid from a vessel.
Febricula (feb-rik'u-lah). A mild fever of short duration.
Febrifacient (feb-ri-fa'shent). Producing fever.
Febrifuge (feb're-fuj). An agent that lessens fever.
Febrile (feb'ril). Pertaining to fever.
Feces (fe'sez). Excrement; the discharge of the bowels.
Feculent (fek'u-lent). Foul with impure substances; abounding with sediment matter.
Femoral (fem'or-al). Pertaining to the femur.
Femur (fe'mur). The thigh-bone.
Ferment (fer'ment). A substance which in small quantities is capable of setting up changes in another substance without itself undergoing much change.
Ferruginous (fer-ru'ji-nus). Containing iron.
Fetid (fet'id). Having an offensive smell.
Fetor (fe'tor). Any strong, offensive smell.
Fetus (fe'tus). The product of conception after the fourth month of gestation.
Fiber (fi'ber). A filamentary or thread-like structure.
Fibrin (fi'brin). A nitrogenous proteid coagulating in exposed blood.
Fibrinous (fi'brin-us). Composed of fibrin.
Fibroid (fi'broid). Having a fibrous structure.
Fibrosis (fi-bro'sis). The development of fibrous tissue in an organ.

Fibrous (fi'brus). Consisting of or pertaining to fibers.
Filtration (fil-tra'shun). The process of straining or filtering.
Filament (fil'a-ment). A thread-like structure.
Fimbria (fim'bre-ah). A fringe.
Fissure (fish'ur). A grove or cleft.
Fistula (fis'tu-lah). An abnormal tube-like passage in the body.
Flaccid (flak'sid). Soft, flabby and relaxed.
Flagellation (flaj-el-a'shun). Flogging, recommended as a means of checking pospartum hemorrhage.
Flashing-point (flash'ing-point). The temperature at which gas from an oil will ignite if brought into contact with a flame.
Flatulence (flat'u-lence). The presence of gas n the digestive canal.
Flatus (fla-tus). Gas in the alimentary canal.
Flector (flek'tor). A flexor.
Flexibilitas (fleks-i-bil'i-tas). Flexibility.
Flexibilitas Cerea (fleks-i-bil'i-tas se're-a). A cataleptic condition in which the limbs remain fixed as they are placed.
Flexible (fleks'i-ble). That which may be bent.
Flexor (fleks'or). A muscle that bends or flexes a part.
Flexura (fleks-u'rah). A bending or curve in an organ.
Flocculent (flok'ku-lent). Containing shreds; flaky.
Fluctuation (fluk-tu-a'shun). A wave-like motion.
Flushing (flush'ing). To cleanse by forcing water through. A glow of red in the face.
Flux (fluks). Dysentery; a liquid flow or discharge.
Fœtus (fe'tus). Same as fetus.
Follicle (fol'ik-l). A small secretory cavity or sac.
Follicular (fol-ik'u-lar). Containing follicles.
Fomentation (fo-men-ta'shun). The application of warm liquids to the body.
Fontanel (fon-tan-el'). A membranous space at the junction of the cranial bones in an infant, due to incomplete ossification.
Foramen (for-a'men). A passage or an opening.
Forceps (for'seps). A two-bladed instrument for grasping objects firmly.
Formication (for-mi-ka'shun). A creeping sensation.
Formula (form'u-lah). A prescribed method; a recipe.
Fornices (for'ni-ses). Plural of fornix.
Fornicolum (for'ne-kol-um). Anterior pillar of fornix.
Fornix (for'niks). An arched portion of the brain composed of the two hippocampus and their respective fimbrias.
Fortification Spectrum (for-ti-fi-ka'shun spek'trum). See teichopsia.
Fracture (frak'chur). The breaking of a bone.
Frenzy (fren'ze). Violent mania.
Friable (fri'a-bl). Easily broken or pulverized.
Friction (frik'shun). The act of rubbing.
Frigid (frij'id). Cold; stiff; apathetic; distant; unfeeling; irresponsive.
Fugacious (fu-ga'shush). Flying or fleeing away; volatile.
Fulcrum (ful'krum). A prop or support.
Fuming (fum'ing). Smoking; raging; fretting.
Function (funk'shun). The normal or special action of a part.
Functional (funk'shun-al). Pertaining to function.
Fundament (fun'da-ment). The base; the anus.
Fungi (fun'ji). A section of saprophytic cryptograms.
Fungoid (fun'goid). Having the appearance or character of a fungus.
Fungous (fun'gus). Pertaining to a fungus.
Fungus (fun'gus). A spongy, morbid growth.
Fusion (fu'shun). The process of liquefying a solid by heat.
Fustigation (fus-ti-ga'shun). Flagellation, as in passage.

G

Galvanic (gal-van'ik). Pertaining to galvanism.
Galvanism (gal'van-ism). A form of electricity produced by chemic reaction.
Galvanization (gal-van-i-za'shun). The transmission of a galvanic current through a part of the body.
Ganglioma (gang-le-o'mah). A swelling of a lymphatic gland.
Ganglion (gan'gli-on). A semi-independent nervous center. An enlarged lymphatic gland.
Ganglionic (gang-le-on'ik). Pertaining to a ganglion.
Gangrene (gang'gren). The mortification or death of soft tissue.
Gargle (gar'gl). A wash for the throat. To wash the throat.
Garlic (gar'lik). The plant Alium Sativum. It is a tonic.
Gaseous (gas'e-us). Of the nature of gas.
Gastric (gas'trik). Pertaining to the stomach.
Gastricism (gas-tris'ism). Dyspepsia.
Gastritis (gas-tri'tis). Inflammation of the stomach.
Gastroenteric (gas-tro-en-ter'ik). Pertaining to both stomach and intestines.
Gastroenteritis (gas-tro-en-ter-i'tis). Inflammation of the stomach and bowels.
Gastrointestinal (gas-tro-in-tes'tin-al). See gastroenteric.
Gelatin (jel'a-tin). A nitrogenous principle obtained by boiling certain animal tissues, as cartilage, ligaments, etc.
Gelatinous (je-lat'i-nous). Resembling gelatin; jelly-like.
Generation (jen-er-a'shun). The begetting of offspring.
Generative (jen-er-a'tive). Pertaining to generation.
Genital (jen'i-tal). Pertaining to the organs of generation.
Genitalia (jen-i-ta'li-ah). The organs of generation.
Genitourinary (jen-i-to-u'ri-na-re). Pertaining to both genital and urinary organs.
Germicide (jer'mi-sid). An agent destroying germs.
Germination (jer-min-a'shun). The development of a seed or germ.
Geromorphism (jer-o-morf'ism). The appearance of age in a young person.
Geruntic (jer-on'tik). Pertaining to old age.
Gestation (jes-ta'shun). The act of carrying young in the womb from conception to delivery.
Giddiness (gid'e-nes). A sensation of whirling.
Ginglymus (ging'glim-us). A hinge-joint.
Glairy (glar'e). Slimy; albuminous.
Gland (gland). An organ which secretes some fluid from the blood.
Glandular (glan'du-lar). Pertaining to a gland.
Glaucoma (glaw-ko'mah). A disease of the eye characterized by increased intraocular tension.
Gleet (glete). A mucous discharge, especially from the urethra; a thin ichor running from a sore.
Gleety (gle'te). Resembling or affected with a gleet.
Glioma (gli-o'mah). Tumor composed of neuroglia.
Globular (glob'u-lar). Shaped like a globe.
Globule (glob'ul). A small spheric body.
Glossa (glos'ah). The tongue.

Glossography (glos-og'ra-fe). A description of the tongue.
Glossohyal (glos-o-hi'al). Pertaining to the tongue and hyoid bone.
Glottis (glot'tis). Aperature between the arytenoid cartilages of the larynx.
Gluteal (glu'te-al). Pertaining to the buttocks.
Glutinous (glu'ti-nus). Resembling or containing glue.
Glycerin (glis'er-in). The sweetish principle of oils and fats.
Glycyrrhiza (glis-er-i'zah). A genus of plants and also the demulcent root of licorice root.
Gnathitis (na-thi'tis). Inflammation of the jaw.
Gnathoplasty (na'tho-plas-te). A plastic operation; the jaw.
Goiter or Goitre (goi'ter). An enlargement of the thyroid gland.
Gonagra (gon-a'grah). Gout of the knee.
Gonecystic (gon-e-sis'tik). Pertaining to the seminal vesicles.
Gonecystitis (gon-e-sis-ti'tis). Inflammation of a seminal vesicle.
Gonyalgia (gon-e-al'je-ah). Pain in the knee.
Gonyocele (gon'e-o-sel). White swelling of the knee.
Gout (gowt). A disease associated with joint inflammation, swelling, uric acid in the blood, etc.
Granular (gran'u-lar). Composed of grains or granulations.
Granulation (gran-u-la'shun). Formation of small elevations on a healing surface.
Granule (gran'ul). A small rounded grain. A spore.
Graphite (graf'ite). A native form of carbon.
Gray Matter (gra mat'ter). The cortical substance of the brain.
Grip or Grippe (grip). See influenza.
Groin (groin). The depression between thigh and trunk.
Groove (groov). A furrow, channel, crease or fold.
Grumous (gru'mus). Thick; viscid; clotted.
Gullet (gul'et). See esophagus.
Gutta-percha (gut'ah-per'cha). The flexible concrete juice of an East India tree. It is used as a protective application.
Gymnastics (jim-nas'tiks). Systematic bodily exercise.
Gypsum (jip'sum). Native calcium sulphate.

H

Hallucination (hal-lu-si-na'shun). A false perception or image.
Harmonia (har-mo'ne-ah). A suture between two bones in which the opposed surfaces are smooth.
Harmonious (har-mo'ne-us). Having the parts proportioned to each other.
Harmonizing (har'mo-niz-ing). See harmonia.
Hartshorn (hartz'horn). Ammonia.
Haschisch (hash'ish). A narcotic and intoxicating preparation of the plant called Indian hemp.
Hectic (hek'tik). The fever of advanced disease.
Hectic Flush (hek'tik flush). Reddening of the cheeks in tuberculosis.
Helonin (hel-o'nin). An extract. It is diuretic and anthelmintic.
Hematemesis (hem-a-tem'e-sis). The vomiting of blood.
Hematimeter (hem-a-ti-me'ter). See hematocytometer.
Hematocytometer (hem-at-o-si-tom'et-or). A device for counting the corpuscles in a given volume of blood.
Hematoma (hem-a-to'mah). A tumor containing blood.
Hemicrania (hem-e-kra'ne-ah). Neuralgia of half of the head. Imperfect development of half of the skull.
Hemiplegia (hem-e-ple'je-ah). Paralysis of one side of the body.
Hemoptysis (hem-op'ti-sis). The spitting of blood.
Hemorrhage (hem'or-age). A flow of blood from the vessels.
Hemorrhoid (hem'or-oid). A pile; a small blood tumor at the anus opening.
Hepatic (he-pat'ik). Pertaining to the liver.
Hepatica (he-pat'i-ka). Medicines affecting the liver.
Hepatitis (hep-a-ti'tis). Inflammation of the liver.
Herbivorous (her-biv'o-rus). Eating vegetation.
Heredity (he-red'i-te). The influence of parents upon offspring.
Hermetic (her-met'ik). Protected from air; air tight.
Hernia (her'ne-ah). The protusion of a viscus from its normal position.
Herpes (her'pez). A skin disease with patches of distinct blisters.
Hiccough (hik'kup). A spasmodic inspiration suddenly arrested by an involuntary closure of the glottis.
Hiccup (hik'kup). Same as hiccough.
Hinge-joint (hinj'-joint). See diarthrosis.
Hippocampus (hip-po-kam'pus). Either of two convolutions of the brain—hippocampus major being a large white curved body in the inferior cornu of the lateral ventricles of the brain and hippocampus minor a small eminence of white substance in the posterior cornu.
Hippocratic (hip'po-krat'ik). Of or belonging to Hippocrates, a celebrated physician of Greece, regarded as the father of medicine.
Homogenesis (ho-mo-jen'e-sis). The generation of offspring experiencing the same cycle of developmental changes as the parent.
Homogenous (ho-moj'e-nus). With like offspring.
Homogeny (ho-moj'e-ne). With like offspring.
Hordeum (hor'de-um). Barley.
Humanity (hu-man'i-te). The quality of being human.
Humeral (hu'mer-al). Pertaining to the humerus.
Humerus (hu'mer-us). The large bone of the upper arm.
Humid (hu'mid). Moist; damp.
Humor (hu'mor). Any fluid of the body.
Humus (hu'mus). A dark material from decaying vegetable matter.
Hyaline (hi'a-lin). Glassy; crystalline; transparent.
Hydracid (hi-dras'id). Any hydrogen acid containing no oxygen.
Hydragog (hi'dra-gog). Purgative; causing watery discharges.
Hydrocephalic (hy-dro-sef-a'lik). Pertaining to hydrocephalus.
Hydrocephalus (hy-dro-sef'al-us). A collection of water in the head; dropsy of the brain.
Hydrochloric (hi-dro-klo'rik). Consisting of hydrogen and chlorin.
Hydrogen (hi'dro-jen). An elementary substance existing at ordinary temperatures as a colorless, tasteless and inodorous gas, the lightest of all known substances. It forms one-ninth of the weight of water and is present in almost all organic compounds.
Hydropathic (hi-dro-path'ik). Pertaining to hydropathy.
Hydropathy (hi-drop'a-the). The treatment of disease by the use of water.

Hydrothorax (hi-dro-tho'raks). Dropsy of the chest.
Hygiene (hi'je-en). The science of health.
Hygienic (hi-je-en'ik). Pertaining to hygiene.
Hylic (hi'lik). Pertaining to the pulp tissues of the embryo.
Hyloma (hi-lo'mah). Any tumor arising in hylic or pulp tissues.
Hymen (hi'men). The membrane which covers the mouth of the vagina.
Hyoid Bone (hi'oid bone). The bone at the root of the tongue.
Hyperesthesia (hi-per-es-the'se-ah). Excessive sensibility.
Hypermnesis (hi-perm-ne'sis). An abnormal power of memory.
Hyperosmia (hi-per-oz'me-ah). A morbidly acute sense of smell.
Hypertrophic (hi-per-tro'fik). Affected with hypertrophy.
Hypertrophy (hi-per'tro-fe). Abnormal increase in the size of an organ or a part.
Hypnotic (hip-not'ik). An agent causing sleep.
Hypochrondrium (hi-po-kon'dre-um). The region of the abdomen at each side of the epigastrium.
Hypodermatomy (hi-po-der-mat'o-me). Subcutaneous incision.
Hypodermatic (hi-po-der-mat'ik). See hypodermic.
Hypodermic (hi-po-der'mik). Subcutaneous; applied to injections of medicines.
Hypogastrium (hip-o-gas'tri-um). The lower part of the abdomen.
Hypophosphite (hi-po-fos'fit). A salt of hypophosphorous acid.
Hyposmia (hi-poz'me-ah). A diminution in the sense of smell.
Hypothalamus (hi-po-thal'am-us). Name given to the structures of the fore-brain under the thalmus.
Hypotrophy (hi-pot'ro-fe). Defective nutrition.
Hysteria (his-ter'e-ah). A nervous affection in which the patient loses control of the emotions through loss of will-power.
Hysterial (his-te're-al). Of the nature of hysteria.

I

Ichor (i'kor). A colorless matter flowing from an ulcer.
Ichthyocolla (ik-the-o-kal'ah). Isinglass; fish-glue; a gelatin made from the air gladders of a fish.
Ichthyol (ik'the-ol). A liquid prepared from mineral pitch and used in skin diseases.
Icteroid (ik'ter-oid). Resembling jaundice.
Idiocy (id'e-o-se). A condition of extreme mental deficiency.
Idiopathic (id-e-o-path'ik). Spontaneous; primary.
Idiosyncrasy (id-e-o-sin'kra-se). Individual peculiarity.
Idiot (id'e-ot). A person with defective mental development.
Illuminant (il-lu'mi-nant). That which affords light.
Imitable (im'i-ta-ble). Capable of being imitated or copied.
Immersed (im-merst'). Covered by water or other fluid; plunged.
Immersion (im-mer'shun). The plunging of a body into a liquid.
Immune (im-mun'). Safe from attack; protected by vaccination.
Immunity (im-mu'ni-te). Freedom from risk of infection.
Immunization (im-mu-ni-za'shun). The act of rendering immune.
Impervious (im-per've-us). Not permitting a passage.
Impetigo (im-pet'i-go). An acute pustular inflammation of the skin.
Impotence (im'po-tense). Want of strength or power, physical, intellectual, or moral; weakness; defect of power to perform anything.
Impregnate (im-preg'nate). To fertilize or make pregnate.
Impregnation (im-preg-na'shun). The act of impregnating; the state of becoming impregnated.
Impressible (im-pres'-ible). Capable of being impressed.
Impression (im-presh'un). A hollow or depression.
Impurity (im-pu'ri-te). That which is impure; foul matter.
Inanimate (in-an'i-mate). Destitute of life; dead; dull; inactive.
Inanition (in-ah-nish'un). Emptiness; exhaustion from fasting.
Inarticulate (in-ar-tik'u-late). Vocal sounds not arranged into syllables.
Incoherent (in-ko-he'rent). Not connected or coherent.
Incontinence (in-kon'ti-nense). Involuntary evacuation.
Incubation (in-ku-ba'shun). The time elapsing from exposure to a disease until symptoms appear.
Incus (in'kus). The middle bone of the inner ear.
Indigenous (in-dij'e-nus). Native; produced in a country.
Indolent (in'do-lent). Sluggish; of slow growth.
Indurated (in-du-ra'ted). Hardened.
Induration (in-du-ra'shun). The hardening of a tissue or part.
Indurative (in'du-ra-tiv). Pertaining to induration.
Inebriant (in-e'bre-ant). An intoxicating substance.
Inebriation (in-e-bre-a'shun). A drunken condition.
Inertia (in-er'shah). Sluggishness; inactivity.
Infant (in'fant). A baby, less than two years of age.
Infantile (in'fan-til). Pertaining to infancy.
Infantile Paralysis (in'fan-til pa-ral'i-sis). Acute inflammation of the anterior horns of the gray matter of the spinal cord.
Infection (in-fek'shun). The communication of disease germs.
Inferior (in-fe'ri-or). Lower.
Infiltration (in-fil-tra'shun). A fluid effusion into an organ or a tissue.
Infinite (in'fi-nite). Immeasurable, boundless; vast; countless; unbounded.
Infirm (in-ferm'). Weak or feeble.
Inflammation (in-flam-ma'shun). A morbid condition with pain, heat, swelling and disordered function.
Inflammatory (in-flam-ma-to-re). Pertaining to inflammation.
Inflation (in-fla'shun). Distended with air.
Inflection (in-flek'shun). A bending inward.
Influenza (in-flu-en'zah). A contagious epidemic catarrhal fever with great prostration and varying symptoms and sequels; grip.
Influx (in'fluks). An inflow.
Infusion (in-fu'shun). Extracting properties by steeping. The slow injection of liquid into a vein.
Ingesta (in-jes'tah). Substances introduced into the body as food.
Ingestion (in-jes'chun). The introduction of food into the body.
Ingredient (in-gre'de-ent). Any part of a compound.
Inguinal (in'gwin-al). Pertaining to the groin.
Inhalation (in-ha-la'shun). The inbreathing of air.

Inhaled (in-hald'). See inhalation.
Injection (in-jek'shun). The forcing of a liquid into a cavity, part or vessel of the body.
Innervation (in-ner-va'shun). A state of nervelessness; special activity excited in any part of the nervous system.
Innominate (in-nom'i-nate). Nameless. A term applied to many parts of the body in place of more specific names.
Inoculation (in-ok-u-la'shun). The introduction of specific virus into the system.
Inodorous (in-o'dor-us). Having no smell.
Inosculating (in-os'ku-lat-ing). Directly joining.
Insidious (in-sid'e-us). Not manifest; hidden or stealthy.
Insipid (in-sip'id). Wanting the qualities which affect the organs of taste; flat in taste.
Insoluble (in-sol'u-ble). Incapable of solution.
Insomnia (in-som'ne-ah). Inability to sleep.
Inspiration (in-spi-ra'shun). The inhalation of air into the lungs.
Integument (in-teg'u-ment). A covering, especially the skin.
Intellect (in'tel-ekt). The mind or the reasoning power.
Intellection (in-tel-ek'shun). Mental activity.
Intemperance (in-tem'per-ance). The immoderate use of food or drink or both.
Intensity (in-ten'si-te). A high degree of power or activity.
Intercellular (in-ter-sel'u-lar). Between cells.
Intercostal (in-ter-kos'tal). Between the ribs.
Interglobular Spaces (in-ter-glob'u-lar spa'sez). Certain irregular areas near the outside of the teeth.
Interlobular (in-ter-lob'u-lar). Between lobules.
Interment (in-ter'ment). The burial of the dead.
Intermittent (in-ter-mit'ent). Occurring at intervals.
Internal (in-ter'nal). On the inside.
Interstices (in-ter'sti-sez). Spaces; intervals; pores.
Interstitial (in-ter-stish'al). Lying or placed between.
Intestinal (in-tes'ti-nal). Pertaining to the intestines of the animal body.
Intestine (in-tes'tine). The digestive tube from the stomach to the anus.
Intima (in'tim-ah). The innermost coat of the vessels.
Intimitis (in-tim-i'tis). Inflammation of an intima.
Intraocular (in-trah-ok'u-lar). Within the globe of the eye.
Intravenous (in-trah-ve'nus). Within a vein.
Intrinsic (in-trin'sik). Inherent; inward. Peculiar to a part.
Introversion (in-tro-ver'shun). A turning inward.
Intuitively (in-tu'i-tive-le). By immediate perception; without reasoning.
Intussusception (in-tus-sus-sep'shun). The falling of one part of an intestine into another.
Inunction (in-ungk'shun). The act of rubbing in an ointment.
Iodid (i'o-did). A compound of iodin.
Iodin (i'o-din). A poisonous nonmetallic element with a metallic luster, used in medicine as an alterative.
Iodoform (i-o'do-form). A yellow antiseptic powder used largely in medicine.
Ipecac (ip'e-kak). See ipecacuanha.
Ipecacuanha (ip-e-kak-u-an'ha). The roots of tropical herbs and shrubs used as an emetic, expectorant and cholagog.
Iridectomy (ir-id-ek'to-me). The cutting of part of the iris.
Iris (i'ris). The colored membrane of the anterior part of the eye.
Iritis (i-ri'tis). Inflammation of the iris.
Irrigate (ir'ri-gate). To wash out.
Irritable (ir'ri-ta-ble). Easily inflamed or irritated.
Irritation (ir-ri-ta'shun). Excitement; stimulation.
Isinglass (i'zing-glas). A pure gelatin made chiefly from the air bladders of sturgeons.
Isolation (i-so-la'shun). The seclusion of patients with contagious diseases.

J

Jactitation (jak-ti-ta'shun). Restlessness; a moving to and fro.
Jamaicin (ja-ma'sin). Bitter cathartic substance from the bark of the cabbage-tree.
Jaundice (jawn'dis). A yellow coloration of the skin.
Jaw (jaw). Either of the two maxilliary bones serving the purpose of seizing and masticating the food.
Jecur (je'ker). The liver.
Jejunal (je-ju'nal). Pertaining to jejunum.
Jejunitas (je-ju'ni-tas). Fasting.
Jejunum (je-ju'num). The upper two-fifths of the small intestine.
Jugal (ju'gal). Connecting or uniting.
Jugular (ju'gu-lar). Pertaining to the throat.
Jugulation (jug-u-la'shun). The swift arrest of disease by therapeutics.
Julep (ju'lep). A sweetened liquid medicine.

K

Kalium (ka'le-um). See potassium.
Karyon (kar'e-on). The cell-nucleus.
Karyoplasm (kar'e-o-plasm). The nuclear substances of a cell.
Kefir (ke'fer). See kephyr.
Kenophobia (ken-o-fo'be-ah). A fear of large empty spaces.
Kephyr (ke'fer). A variety of fermented milk.
Kerasin (ker'a-sin). A cerebrosid occurring in brain-tissue.
Keratitis (ker-a-ti'tis). Inflammation of the cornea.
Kerion (ke're-on). A pustular scalp disease.
Kidney (kid'ne). The organ secreting urine.
Kinesipathy (kin-e-sip'a-the). The gymnastic treatment of disease.
Kinesodic (kin-e-sod'ik). Pertaining to motor impulses.
Kinesthesis (kin-es'the-sis). The sense by which muscular movement is appreciated.
Kleptomania (klep-to-ma'ne-ah). A morbid desire to steal.
Kola (ko'lah). The seeds of Cola Acuminata, used as a nervine and cardiac stimulant.
Kumis (koo'mis). Fermented mare's milk.

L

Labia (la'bi-ah). The lips.
Lachrymal (lak'ri-mal). Pertaining to or secreting tears.
Lactation (lak-ta'shun). The function of secreting and excreting milk.
Lacteal (lak'te-al). Pertaining to milk. One of the lymphatics of the small intestine that takes up chyle.
Lactopeptine (lak-to-pep'tin). The proprietory name for a mixture of pepsin diastase and pancreatin with lactic and hydrochloric acid.
Lamina (lam'in-ah). A thin layer or scale.
Laminated (lam'i-na-ted). Arranged in layers.
Lamination (lam-i-na'shun). Arrangement in plates or layers.
Lancet (lan'set). A two-edged surgical knife.

Lancinating (lan'si-na-ting). Piercing; darting; as a pain.
Languor (lan'gwer). Lassitude; feebleness; weakness.
Larva (lar'va). An insect in its earliest form after leaving the egg.
Laryngitis (lar-in-ji'tis). Inflammation of the larynx.
Laryngophthisis (lar-in-gof-thi'sis). Tuberculosis of the larynx.
Laryngoplasty (lar-in'go-plas-te). Plastic surgery of the larynx.
Laryngoscope (lar-in'go-skop). An instrument for the examination of the larynx.
Laryngoscopy (lar-in-gos'ko-pe). Inspection of the larynx.
Laryngospasm (lar-in-go-spasm). Spasmodic contracture of the glottis.
Laryngotomy (lar-in-got'o-me). The operation of cutting into the larynx.
Larynx (lar'ingks). The upper part of the windpipe; organ of voice.
Lassitude (las'si-tude). Weakness; exhaustion; dullness; weariness.
Latent (la'tent). Concealed; not manifest.
Lateral (lat'er-al). Pertaining to the side.
Laudanum (lod'an-um). Tincture of opium.
Lavandula (lav-an'du-lah). A genus of plants.
Laxative (laks'a-tiv). A mild purgative.
Leech (leech). A blood-sucking aquatic worm.
Legume (leg'um). A pod or cod, as a pea-pod as a peascod.
Legumin (leg-u'min). A nitrogenous proteid from legumes, as peas, beans, etc.
Leptandra (lep-tan'drah). The laxative root of veronica virginica.
Leptandrin (lep-tan'drin). A purgative resinoid from leptandra.
Lesion (le'zhun). Structure tissue-change from injury or disease; a hurt or wound.
Lethargy (leth'ar-je). A condition of drowsiness.
Leucorrhea (lu-ko-re'ah). A white discharge from the vagina.
Lichen (li'ken). A papular inflammation of the skin.
Licorice (lik'o-ris). The root and extract Glycyrrhiza glabra.
Lienteric (li-en-ter'ik). Pertaining to a special form of diarrhœa.
Ligament (lig'a-ment). A band of fibrous tissue binding parts together.
Ligamentum (lig-a-men'tum). A ligament.
Ligation (li-ga'shun). The operation of tying, as of an artery.
Ligature (lig'a-chur). The material used for tying.
Lincture (link'ture). A soothing cough medicine.
Liniment (lin'i-ment). A liquid preparation for external use.
Liquid (lik'wid). A substance that flows.
Liquorice (lik'o-ris). Same as licorice.
Lithontriptic (lith-on-trip'tik). A medicine which destroys a stone in the bladder.
Lithotomy (li-thot'o-me). The operation of cutting for stone in the bladder.
Lithotrity (li-thot'ri-te). The operation of breaking a stone in the bladder into small pieces capable of being voided.
Livid (liv'id). Discolored from the effects of congestion or contusion; black and blue.
Lobe (lob). A rounded division of an organ.
Lobule (lob'ul). A small lobe.
Lochia (lo-ki'ah). The evacuations which follow childbirth.
Locomotion (lo-ko-mo'shun). Animal movement.
Longevity (lon-jev'i-te). Long life.
Lotion (lo'shun). Any medicinal solution for external use.
Lumbago (lum-ba'go). Pain in the loins.
Lumbar (lum'bar). Pertaining to the loins.
Lunar Caustic (lu'nar kaws'tik). Silver nitrate.
Lung (lung). One of the two organs of respiration.
Lymph (limf). A colorless alkaline fluid in the lymphatics.
Lymphatics (lim-fat'iks). The lymph-tubes of the body; vessels which carry lymph.
Lyra of the Fornix (li'rah for'niks). The harp-like portion of the fornix formed by cross-lying fibers running from one crus fornices to the other as they come together.
Lysis (li'sis). Gradual decline of a disease, especially a fever.

M

Maceration (mas-er-a'shun). Steeping in fluid; softening.
Magnesia (mag-ne'ze-ah). Magnesium oxid; a laxative.
Malady (mal'a-de). An illness or disease.
Malaise (ma-laz'). A feeling of uneasiness or discomfort.
Malaria (ma-la'ri-a). An infectious disease caused by a blood-parasite.
Malarial Fever (ma-la're-al fe'ver). The periodic fever of malaria.
Malassimilation (mal-as-sim-i-la'shun). Imperfect assimilation or nutrition; faulty digestion, conversion and appropriation of nutriment.
Malformation (mal-for-ma'shun). Ill or wrong formation. An abnormal shape or structure.
Malignant (ma-lig'nant). Virulent; fatal.
Malleolus (mal-le'o-lus). A projection of either bone of the lower leg where it joins the ankle.
Malleus (mal'e-us). A small bone of the internal ear.
Mamma (mam'ah). The breast; an organ for secreting milk.
Mammary (mam'a-re). Pertaining to the mammas.
Maniacal (man-ni'a-kal). Having the nature of madness.
Manikin (man'i-kin). A model of a human being.
Manipulation (ma-nip-u-la'shun). Manual treatment; handling.
Manipulus (ma-nip'u-lus). A handful.
Marginal (mar'jin-al). Pertaining to, or at, the border of.
Marsh-fever (marsh-fe'ver). Malarial fever.
Marvelous (mar've-lus). Wonderful; strange; exciting wonder or some degree of surprise.
Massage (mas-sazh'). Manipulation; methodic pressure; friction and kneading of the body.
Mastication (mas-ti-ka'shun). The act or operation of masticating or chewing food.
Masticatory (mas'ti-ka-to-re). Chewing; adapted to perform the office of chewing food.
Mastitis (mas-ti'tis). Inflammation of the breast.
Matrix (ma'triks). A producing or containing substance; intercellular tissue, as of cartilage. The womb.
Mature (ma-chur'). Ripe; fully developed.
Maturity (ma-tu'ri-te). Ripeness; the state or quality of being mature.
Matzoon (mat'zun). Milk treated with a peculiar ferment.
Maxilla (maks-il'ah). One of the upper or lower jawbones.
Maxillary (maks'il-a-re). Pertaining to the jaws.
Maximum (maks'i-mum). The height of a disease. The largest quantity.

Meatus (me-a'tus). A passage or opening.
Meconium (me-ko'ni-um). The first fecal discharges of a new-born infant.
Medulla (me-dul'lah). The marrow in various cavities or any fatty substance resembling marrow. The spinal cord.
Medullary (med'ul-la-re). Pertaining to, consisting of, or resembling marrow.
Membrane (mem'bran). A thin enveloping or lining substance.
Membranous (mem'bran-us). Having the nature of a membrane.
Meningeal (men-in'je-al). Pertaining to the meninges.
Meninges (men-in'jez). The membrane of the brain and cord.
Meningitis (men-in-ji'tis). Inflammation of the meninges.
Menopause (men'o-pauz). The end of the menstrual life.
Menses (men'ses). The monthly flow of females.
Menstrual (men'stru-al). Pertaining to menstruation.
Menstruation (men-stru-a'shun). Function of the female producing menstrual flow.
Menstruum (men'stru-um). A salvent.
Mesenteric (mes-en-ter'ik). Pertaining to the mesentery.
Mesentery (mes'en-ter-e). The peritoneal attachment of the small intestine.
Metabolism (met-ab'o-lism). A change in the intimate condition of cells, constructve or destructive.
Metamorphism (met-a-mor'fizm). See metamorphosis.
Metamorphopsia (met-a-mor-fop'se-ah). A visual defect with an apparent distortion of objects.
Metamorphosis (met-a-mor'fo-sis). Transformation; structural change.
Metastasis (me-tas'ta-sis). A change in the seat of a disease.
Meteorology (me-te-or-ol'o-je). The science which treats of atmospheric phenomena.
Meter (me'ter). The unit of linear measure of the metric system.
Miasm (mi'azm). See miasma.
Miasma (mi-as'ma). Infection floating in the air.
Microbic (mi-kro'bik). Pertaining to microbes.
Micrococcus (mi-kro-kok'kus). A genus of fission-fungi in which the cells are spherical or oval.
Micrology (mi-krol'o-je). The science of microscopic objects.
Microorganism (mi-kro-or'gan-izm). A minute living body.
Microscopic (mi-kro-skop'ik). Minute; very small; visible only by the aid of a microscope.
Microscopist (mi-kro'skop-ist). One skilled in microscopy.
Microscopy (mi-kros'ko-pe). The use of the microscope.
Micturition (mik-tu-rish'un). The act of voiding urine.
Midwife (mid'wif). A woman who assists women in childbirth.
Migraine (mi-gran'). A headache characterized by a vehement pain confined to one side of the head.
Mildew (mil'du). The common name for any one of a number of small fungi destructive to living plants and dead vegetable substances.
Miliaria (mil-e-a're-ah). Sudamina; a disorder of the sweat-glands with obstruction of their ducts.
Minim (min'im). The smallest liquid measure; about equal to a drop.
Minimum (min'i-mum). The smallest amount.
Miscarriage (mis-kar'age). The expulsion of the fetus between the fourth and sixth months of pregnancy. Abortion.
Mitigated (mit'i-ga-ted). Made milder.
Mitral (mi'tral). Miter-like; applied to the left auriculoventricular valve of the heart.
Mitral Valves (mi'tral valves). The valves of the heart.
Mobile (mo'bil). Movable.
Mobile spasm (mo'bile spazm). A form of tonic spasm with slow and irregular movements of the limbs.
Mobility (mo-bil'i-te). The property of being easily moved.
Molecular (mo-lek'u-lar). Pertaining to molecules.
Molecule (mol'e-kul). The smallest quantity of a substance that may exist and preserve its characteristic qualities.
Molluscum (mol-lus'kum). A chronic skin disease with pulpy tumors.
Momentous (mo-men'tus). Very important; weighty; of the greatest consequence.
Monogamous (mo-nog'a-mus). Upholding the practice of marrying only one.
Monoxid (mon-oks'id). An oxid with one oxygen atom.
Monster (mon'ster). An organism of abnormal development, especially one in which parts or organs are duplicated; a prodigy; a marvel.
Monstrosity (mon-stros'i-te). The condition of a monster; a monster.
Monstrous (mon'strus). Unnatural in form; out of the common course of nature; frightful; horrible.
Morbid (mor'bid). Diseased; sickly; not sound and healthful.
Morbidity (mor-bid'i-te). The proportion of disease to health in a community.
Morbific (mor-bif'ik). Causing disease.
Morphea (mor-fe'ah). A skin disease in which pinkish patches show in firm lesions often leaving a scar-like marking upon their disappearance.
Mortal (mor'tal). Liable to death; deadly.
Mortality (mor-tal'i-te). The death rate. The state of being mortal.
Mortification (mor-ti-fi-ka'shun). See gangrene.
Mortify (mor'ti-fi). To lose vitality and organic structure while yet a portion of a living body; to gangrene.
Motile (mo'til). Capable of spontaneous motion.
Mucopurulent (mu-ko-pur'u-lent). Containing mucus and pus.
Mucous Membrane (mu'cus mem'bran). The membrane lining all the cavities of the body which open externally.
Mucus (mu'kus). The viscid liquid secretion of mucous membrane.
Mullein (mul'in). See verbascum.
Muscarin (mus'ka-rin). An alkaloid from fly-fungus.
Musculomembranous (mus-ku-lo-mem'bran-us). Composed of muscle and membrane.
Mutilation (mu-ti-la'shun). The loss of a member of an organ.
Myalgia (mi-al'je-ah). Pain in the muscles.
Myelitis (mi-el-i'tis). Inflammation of the spinal cord.
Myelon (mi'el-on). The spinal cord.
Myopia (mi-o'pe-ah). Near-sightedness; a visual defect from focalization of the image in front of the retina.
Myopic (mi-op'ik). Pertaining to myopia.
Myrrh (mur). A gum resin from Commiphora Myrrha; it is a stimulant tonic.

N

Nanism (nan'izm). Dwarfishness; the state of being undersized.
Nanous (nan'us). Dwarfed.
Nape (nap). The back of the neck; the nucha.
Narcotic (nar-kot'ik). A hypnotic allaying pain.
Nares (na're). Plural of naris.
Naris (na'riz). The nostril.
Nasal (na'sal). Pertaining to the nose.
Nasal Bones (na'sal bones). Two small bones forming the arch of the nose.
Nasitis (na-zi'tis). Inflammation of the nose.
Nausea (naw'se-ah). Sickness at the stomach; a desire to vomit.
Nauseant (naw'se-ant). A substance which produces nausea.
Necrosis (ne-kro'sis). The death of a circumscribed piece of tissue.
Nematoid (nem'a-toid). Resembling a thread. A thread-worm.
Nephritic (ne-frit'ik). Pertaining to the kidneys.
Nephritis (ne-fri'tis). Inflammation of the kidneys.
Nervine (nerv'ine). A medicine which soothes nervous excitement.
Neuralgia (nu-ral'je-ah). Pain in a nerve.
Neurilemma (nu-ril-em'ah). The sheath incasing a nerve.
Neuroglia (nu-rog'le-ah). The reticulated framework of the substance of the brain and spinal cord.
Neurolemma (nu-rol-em'ah). See neurilemma.
Neuroma (nu-ro'mah). A nerve-tumor.
Neurosis (nu-ro'sis). Any disease of the nerves in which no structural change is apparent.
Nevus (ne'vus). A birth-mark.
Nidus (ni'dus). A nest. A cluster. A focus of infection.
Nitre (ni'ter). Saltpeter; nitrate of potash.
Nitrogen (ni'tro-jen). A colorless nonmetallic, gaseous element. A main constituent of air.
Nitrogenous (ni-troj'e-nus). Containing nitrogen.
Nitroglycerin (ni-tro-glis'er-in). An oily, toxic, explosive liquid.
Noctambulation (nok-tam-bu-la'shun). Sleep-walking.
Nocturnal (nok-ter'nal). Pertaining to the night.
Nodal (no'dal). Relating to a node.
Node (nod). An indurated swelling on a tendon or a bone.
Nodular (nod'u-lar). Covered with nodes.
Nonviable (non-vi'a-ble). Not able to live.
Normal (nor'mal). Healthy; natural.
Normoblast (nor'mo-blast). A blood corpusle of normal size.
Nosography (no-sog'ra-fe). A description of disease.
Nosology (no-sol'o-je). The science of diseases; the scientific classification of diseases.
Nostalgia (nos-tal'je-ah). Homesickness.
Nostrum (nos'trum). A quack or patent medicine.
Noxious (nok'shus). Harmful; poisonous.
Nucha (nu'kah). See nape.
Nuclear (nu'kle-ar). Pertaining to the nucleus.
Nucleus (nu'kle-us). The controlling center of a muscle or organ. The central element in a compound.
Nutriment (nu'tri-ment). Anything that nourishes.
Nutritious (nu-trish'us). Yielding nourishment.
Nutritive (nu'tri-tiv). Affording nutrition.

O

Obese (o-bes'). Extremely fat; corpulent.
Obesity (o-bes'i-te). Fatness; corpulence.
Object-blindness (ob'jekt blind'nes). An inability to comprehend objects seen.
Oblique (ob-lek'). Slanting; inclined.
Oblongata (ob-lon-ga'tah). The medulla oblongata.
Obstetrician (ob-ste-trish'an). One who practises obstetrics.
Obstetrics (ob-stet'riks). The science of the care of women during pregnancy, childbirth and the puerperium.
Obstinate (ob'ste-nate). Not yielding to treatment; not easily subdued.
Occipital (ok-sip'i-tal). Pertaining to the occiput.
Occiput (ok'si-put). The back part of the head.
Occlusion (ok-klu'shun). The blocking up of an opening.
Ocher or Ochre (o'ker). Yellow colored clay.
Odorant (o'dor-ant). Odorous; fragrant; a perfume.
Odoriferous (o-dor-if'er-us). Yielding an odor; sweet of scent.
Officinal (off-is'in-al). For sale by pharmacists.
Ointment (oint'ment). A soft, greasy substance or compound used for smearing over any surface, particularly the body or a diseased part.
Oleaginous (o-le-aj'in-us). Having the nature of oil.
Olfaction (ol-fak'shun). The sense of smell.
Olfactory (ol-fak'to-re). The organ of smell; pertaining to smelling; having the sense of smell.
Opacity (o-pas'i-te). Nontransparency; darkness; obscurity.
Opalisin (o-pal-is'in). A proteid in human milk.
Ophthalmic (off-thal'mik). Pertaining to the eye.
Ophthalmoscope (of-thal'mo-skope). A perforated mirror used in inspecting the interior of the eye.
Opiate (o'pe-ate). An opium preparation; a hypnotic.
Optic (op'tik). Pertaining to the eye.
Orbicular (or-bik'u-lar). Circular; spheric.
Orbicular Bone (or-bik'u-lar bone). The round prominence at the end of the incus.
Orbicular Ligament (or-bik'u-lar lig'a-ment). The circular ligament surrounding the head of the radius.
Orbicularis (or-bik-u-la'ris). A name given to muscles whose fibres encircle an orifice.
Orbit (or'bit). The bony cavity for the eyeball.
Orbital (or'bit-al). Pertaining to the orbit.
Organic (or-gan'ik). Pertaining to or having organs.
Organism (or'gan-ism). A living, organized being.
Orifice (or'i-fis). The mouth or aperture of a tube, pipe or other cavity.
Orolingual (o-ro-ling'gwal). Pertaining to the mouth and tongue.
Orthopnea (or-thop'ne-a). A disease in which a person can breathe only when sitting up.
Oscheitis (os-ke-i'tis). Inflammation of the scrotum.
Oscillation (os-sil-la'shun). A swinging or vibration.
Oscitation (os-si-ta'shun). The act of yawning or gaping.
Osculation (os-ku-la'shun). Anastomosis; the act of kissing.
Osseous (os'e-us). Bony; resembling bone.
Ossification (os-si-fi-ka'shun). The change or process of change of flesh or other matter of animal bodies into bony substances.
Otoscope (o'to-skope). An instrument for inspecting the ear.

Ovary (o'va-re). The organ of the female in which ova are formed in animals.
Ovariotomy (o-va-ri-ot'o-me). A surgical operation in which an ovary is taken out.
Ovule (o'vul). The unimpregnated ovum. Any small egglike structure.
Ovum (o'vum). The female reproductive cell of an animal or vegetable; an egg.
Oxid (oks'id). Any binary combination of oxygen.
Oxidation (oks-i-da'shun). The conversion into an oxid.
Oxygen (oks'i-jen). One of the gaseous elements; the supporter of life and combustion.
Oxygenation (oks-i-jen-a'shun). Saturation with oxygen.
Oxyuris (oks-i-u'ris). A genus of nematoid worms.
Ozent (o-ze'nah). A fetid nasal ulceration and discharge.
Ozone (o'zon). An allotropic form of oxygen used as an antiseptic and oxidizing agent.

P

Pabulum (pab'u-lum). Food; anything nutritive.
Palatableness (pal'a-ta-ble-nes). The quality of being agreeable to the taste.
Palate (pal'ate). The roof of the mouth and floor of the nose.
Palatitis (pal-a-ti'tis). Inflammation of the palate.
Palliate (pal'e-ate). To soothe or mitigate.
Palliative (pal'e-a-tiv). Mitigating; relieving.
Pallor (pal'or). Paleness.
Palpable (pal'pa-ble). Easily perceived and detected; unmistakable; plain.
Palpitation (pal-pi-ta'shun). Violent pulsation, as of the heart.
Palsy (pawl'se). See paralysis.
Panacea (pan-a-se'ah). A remedy for all diseases.
Panada (pa-na'da). A food made by pouring boiling water over toasted bread, sweetening and flavoring with mace, nutmeg or wine.
Pancreas (pan'kre-us). A racemose gland in the abdomen; the sweetbread.
Pancreatic (pan-kre-at'ik). Relating to the pancreas.
Pancreatin (pan'kre-a-tin). A ferment from the juice of the pancreas.
Papillae (pa-pil'la). A nipple of the breast. The minute elevations on the surface of the skin, as on the tongue.
Papular (pap'u-lar). Consisting of papules.
Papule (pap'ul). A small elevation of the skin.
Paralysis (pa-ral'i-sis). Loss of sensation or voluntary motion.
Paralytic (par-ah-lit'ik). A person affected with paralysis.
Paraplegia (par-ah-ple'je-ah). Paralysis of the legs.
Parasite (par'a-site). An organism that inhabits another organism and obtains nourishment from it.
Parasiticide (par-a-sit'i-side). A substance destroying parasites.
Paregoric (par-e-gor'ik). A camphorated tincture of opium.
Parenchyma (pa-ren'ki-mah). The tissue outside the blood vessels and derived from the blood; the cellular and fibrous substance of the glands and other solid organs.
Parenchymatitis (par-en-kim-a-ti'tis). Inflammation of the paremchyma.
Parietal (pah-ri'e-tal). Pertaining to a wall.
Parietal Bones (pah-ri'e-tal bones). The bones forming the cranial sides and roof.
Parotid (pa-rot'id). Situated near the ear.
Parotid Glands (pa-rot'id glands). The glands of the cheeks which secrete the saliva.
Paroxysm (par'oks-izm). A period of increase or crisis of a disease.
Paroxysmal (par-oks-is'mal). Pertaining to paroxysm.
Parturition (par-tu-rish'un). The act of giving birth to young.
Pasteurism (pas-ter'ism). Vaccination.
Pasteurization (pas-ter-i-za'shun). The destruction by heating of microbic life in a substance.
Patella (pa-tel'lah). The kneepan or cap of the knee.
Patency (pa'ten-se). The condition of being open.
Pathetic (path-et'ik). That which appeals to or stirs the passions.
Pathogenic (path-o-gen'ik). Causing disease.
Pathognomonic (path-og-no-mon'ik). Characteristic; peculiar to.
Pathognomy (path-og'no-me). The science of the signs by which disease is recognized.
Pathologic (path-o-loj'ik). Pertaining to pathology.
Pathologist (pa-thol'o-jist). A specialist in pathology.
Pathology (pa-thol'o-je). The science of diseases.
Peat (peet). Partially carbonized vegetable material in bogs.
Pectoral (pek'to-ral). Pertaining to the breast. A remedy for chest diseases.
Pectoralis (pek-tor-a'lis). A muscle of the breast.
Pedicle (ped'ik-l). The stalk or attachment of a tumor.
Pediculus (pe-dik'u-lus). The lice that infest man.
Peduncle (pe'dung-kl). A supporting part.
Pedunculated (pe-dung'ku-lat-ted). Having a peduncle.
Pelvis (pel'vis). The bony basin of the trunk formed by the innominate bones and the sacrum.
Pemphigus (pem'fig-us). A skin disease with an eruption of blisters.
Pendulous (pen'du-lus). Hanging or drooping.
Pepsin (pep'sin). A ferment found in gastric juice.
Peptone (pep'tone). A proteid derived from any native proteid through the action of hydralizing agents.
Peptonized (pep'ton-izd). Converted into peptones.
Peptonoid (pep'ton-oid). A substance resembling a peptone.
Perception (per-sep'shun). The acquiring of impressions through the senses.
Perceptivity (per-sep-tiv'i-te). Capacity to receive impressions.
Percolation (per-ko-la'shun). The process of extracting soluble constituents from powdered substances by allowing a solvent to trickle slowly through.
Percussion (per-kush'un). Diagnosis by striking the body a sharp slight blow.
Perflation (per-fla'tion). The act of blowing through.
Perforate (per'fo-rate). To pierce with holes.
Perforator (per'fo-ra-tor). An instrument to open the skull.
Pericarditis (per-e-kar-di'tis). Inflammation of the pericardium.
Pericardium (per-e-kar'de-um). Membranous sac around the heart.
Perineum (per-i-ne'um). The space between the thighs from anus to genitalia.
Periodic (pe-re-od'ik). Occurring at intervals.
Periodicity (pe-re-o-dis'i-te). Recurrent at regular intervals.

Periodontitis (pe-re-o-don-ti'tis). Inflammation of the membrane of a tooth-socket.
Periosteal (per-e-os'te-al). Pertaining to periosteum.
Periosteitis (per-e-os-te-i'tis). Inflammation of the periosteum.
Periosteum (per-e-os'te-um). The fibrous membrane investing the surface of bones except at the points of tendinous and ligamentous attachment, and on the articular surfaces where cartilage is substituted.
Periostitis (per-e-os-ti'tis). See periosteitis.
Peripheral (per-if'er-al). Pertaining to the periphery.
Periphery (per-if'er-e). The circumference or bounding line.
Peristalsis (per-isi-tal'sis). The vermicular motion of the bowels.
Peristaltic (per-i-stal'tik). Belonging to the vermicular contraction and motion of vascular canals, as the alimentary, the circulating, and the generative tubes.
Peristole (per-is'to-le). The same as peristalsis.
Peritoneal (per-i-to-ne'al). Pertaining to the peritoneum.
Peritoneum (per-i-to-ne'um). Serous membrane lining of the abdomen.
Peritonitis (per-i-ton-i'tis). Inflammation of the peritoneum.
Perityphlitis (per-i-tif-li'tis). Inflammation around the cecum.
Permanganate (per-man'ga-nate). A salt of permanganic acid.
Permeable (per'me-a-ble). Pervious; capable of being passed through without rupture, as solid matter.
Permeate (per'me-ate). To pass through the pores of a substance; to saturate.
Pernicious (per-nish'us). Highly destructive; fatal.
Peroxid (per-oks'id). An oxid with the highest amount of oxygen.
Perpetuation (per-pet-u-a'shun). The act of making perpetual or preserving from extinction through an endless existence, or for an indefinite period of time.
Perspiration (per-spi-ra'shun). Excretion of liquid from the skin; sweating.
Pervious (per've-us). Permitting penetration.
Pessary (pes'sah-re). An instrument placed in the vagina to support the uterus.
Pestilence (pes'ti-lence). Any deadly epidemic disease.
Petechia (pe-te'ke-ah). A small spot of discoloration beneath the epidermis.
Petechial (pe-te'ke-al). Pertaining to petechias.
Petrolatum (pet-ro-la'tum). Soft, unctuous substance obtained from petroleum.
Petrous (pe'trus). Resembling stone.
Phagedena (faj-e-de'nah). Gangrenous ulceration; a spreading obstinate ulcer.
Pharmaceutic (far-mah-su'tik). Pertaining to drugs.
Pharmacist (far'ma-sist). An apothecary or a druggist.
Pharyngeal (far-in'je-al). Pertaining to the pharynx.
Pharynx (far'ingks). The muscular sac behind the mouth.
Phenol (fe'nol). Carbolic acid.
Phenomenon (fe-nom'e-non). A symptom. Uncommon occurence.
Phlebitis (fleb-i'tis). Inflammation of a vein.
Phlebotomy (fle-bot'o-me). The act or practice of opening a vein for letting blood.
Phlegm (flem). Watery humor; mucus from the bronchi.
Phlegmatic (fleg-mat'ik). Pertaining to phlegm. Slow, dull.
Phlegmon (fleg'mon). Suppurative inflammation of areolar tissue.
Phlegmonous (fleg'mon-us). Of the nature of a phlegmon.
Phlogistic (flo-jis'tik). Inflammatory.
Phlyctena (flik-te'nah). A vescicle with serous contents; a blister.
Phlyctenular (flik-ten'ular). Having the nature of Phlyctenule.
Phlyctenule (flik-ten'ul). A minute vesicle or phlyctena.
Phosphate (fos'fate). A salt of phosphoric acid.
Phosphorated (fos'for-a-ted). Combined with phosphorus.
Phosphorus (fos'for-us). One of the elements in bone and nerve tissue.
Phrenic (fren'ik). Pertaining to the diaphragm.
Phthisical (this'ik-al). Of, belonging to, or suffering from phthisis.
Phthisis (thi'sis) or (ti'sis). A wasting or consumption.
Physiognomy (fiz-e-og'no-me). The act of reading character by the study of the face.
Physiology (fiz-e-ol'o-je). The science of the functions of the body.
Physiolysis (fiz-e-ol'i-sis). The falling to pieces of dead tissue.
Physostigma (fi-so-stig'mah). A genus of plants.
Pigment (pig'ment). An organic coloring matter.
Pith (pith). The marrow of bones. The spinal cord.
Pityriasis (pit-i-ri'a-sis). A scaly skin disease.
Placenta (pla-sen'tah). The flat, round, spongy body forming the organ of nutrition for the fetus; the after birth.
Plasma (plas'mah). The fluid part of the blood and lymph.
Plasmodium (plas-mo'de-um). The motile mass of protoplasm formed by the organic fusion of two or more amebiform bodies.
Plastic (plas'tik). Capable of being molded.
Plasticity (plas-tis'i-te). The state of being plastic.
Plethora (pleth'o-rah). Abnormal fullness of the blood-vessels.
Plethoric (pleth'o-rik). Pertaining to plethora. Full blooded.
Pleura (plu'rah). The serous membrane enveloping the lungs.
Pleurisy (plu'ri-se). See pleuritis.
Pleuritis (plu-ri'tis). Inflammation of pleura.
Pleurodynia (plu-ro-din'e-ah). Pain in the intercostal muscles.
Plexus (pleks'us). A union of fibers, vessels or nerves in the form of network.
Pneumatothorax (nu-mat-o-tho'raks). See pneumothorax.
Pneumogastric (nu-mo-gas'trik). Pertaining to the lungs and stomach.
Pneumothorax (nu-mo-tho'raks). Gas or air in the pleural sac.
Polluted (pol-lut'ed). Defiled; dishonored.
Polygamous (po-lig'a-mus). Relating to or consisting in polygamy; having a plurality of wives.
Polygamy (po-lig'a-me). The state of having more than one wife or husband at the same time.
Polypus (pol'e-pus). A pedunculated tumor found in the nose, ear, rectum, etc.
Pomade (po-made'). A perfumed ointment.
Pons (ponz). A process of bridge or tissue connecting two parts.
Pore (por). A minute circular opening as in the skin.
Portable (port'a-ble). That may be carried.
Posterior (pos-te're-or). Situated behind; toward the rear.
Post-mortem (post mor'tem). An examination of a body made after death.
Post-partum (post par'tum). Subsequent to child-birth.
Posture (pos'chur). Position; attitude.
Potable (po'ta-ble). Something that may be drunk; a beverage.
Potash (pot'ash). Potassium hydroxid.

Potassium (po-tas'se-um). The metallic base of potash.
Potion (po'shun). A draft. A dose.
Precipitate (pre-sip'i-tate). A substance separated by precipitation.
Precipitation (pre-sip-i-ta'shun). The process of having solids fall to the bottom from liquids that hold them in solution.
Predisposing (pre-dis-po'zing). Inclined to, as a disease.
Predisposition (pre-dis-po-zish'un). A natural tendency.
Pregnancy (preg'nan-se). The condition of being with child.
Pregnant (preg'nant). Being with young, as a female; breeding.
Prehension (pre-hen'shun). The act of grasping.
Premature (pre'ma-chur). Occuring before the proper time.
Premonitory (pre-mon'i-to-re). Having the character of a warning; indicating the onset of a disease.
Preservative (pre-serv'a-tiv). Tending to keep from decay.
Preventative (pre-vent'a-tiv). See preventive.
Preventive (pre-ven'tiv). Anticipating; tending to hinder; hindering the access of; as a medicine preventive of disease.
Primipara (pri-mep'a-rah). A woman bearing or giving birth to her first child.
Primitive (prim'i-tiv). Original.
Primordial (pri-mor'de-al). Pertaining to the beginning.
Probe (prob). To examine a wound or sore by piercing it with a sharp instrument.
Process (pros'es). Experiment. Any protuberance or eminence.
Procreation (pro-kre-a'shun). Reproduction or generation of young.
Profunda (pro-fun'dah). A deep-seated artery.
Prognosis (prog-no'sis). Prediction of course and end of a disease.
Prognostic (prog-nos'tik). Pertaining to the prognosis.
Prolapsus (pro'lap-sus). The falling down of a part.
Proliferation (pro-lif-er-a'shun). Cell-genesis; reproduction.
Prolific (pro-lif'ik). Fruitful; generating abundantly.
Pronate (pro'nate). To render prone.
Pronation (pro-na'shun). The downward turning of the palm.
Pronator (pro-na'tor). A muscle pronating a part.
Prone (prone). Face downward.
Propagate (prop'a-gate). To have young or issue; to increase and multiply.
Propagation (prop-a-ga'shun). The spreading or extension of anything.
Prophylactic (pro-fil-ak'tik). Pertaining to prophylaxis.
Prophylaxis (pro-fil-aks'is). The prevention of a disease.
Prostration (pros-tra'shun). Extreme nervous exhaustion.
Proteid (pro'te-id). See protein.
Protein (pro'te-in). An organic substance found in various forms of animals and plants; albumen.
Protoplasm (pro'to-plazm). Primitive organic cell-matter; germinal matter.
Protoplasmic (pro-to-plaz'mik). Pertaining to protoplasm.
Protoplast (pro'to-plast). An embryonic cell; protoplasm.
Protractor (pro-trak-tor). A muscle drawing forward.
Protuberance (pro-tu'ber-ance). A projecting part.
Prurigo (pru-ri'go). A chronic papular skin disease with intense itching.
Pruritus (pru-ri'tus). Intense itching.
Pseudo (su'do). False.
Psoriasis (so-ri'a-sis). A chronic inflammatory skin disease.
Psychic (si'kik). Pertaining to the mind or soul.
Psychical (si'kik-al). See psychic.
Ptyalism (ti'a-lism). A morbid and copious excretion of saliva.
Ptyalin (ti'a-lin). An amylolytic ferment of saliva.
Puberty (pu'ber-te). The age of capability of reproduction.
Pubis (pu'bis). The pubic bone.
Puerperal (pu-er'per-al). Pertaining to or following child birth.
Puerperium (pu-er-pe're-um). The period from delivery to the completion of involution.
Pulmonary (pul'mo-na-re). Pertaining to the lungs.
Pulmonic (pul-mon'ik). Pertaining to the lungs.
Pulsation (pul-sa'shun). A beating or throbbing sensation.
Pulse (pulse). The beating or rythmic throbbing of the heart.
Pultaceous (pul-ta'shus). Pap-like; mushy; soft.
Pulverization (pul-ver-i-za'shun). The act of reducing to a powder.
Pungent (pun'jent). Acid; penetrating; severe; biting.
Purgation (pur-ga'shun). Evacuation of the bowels; cleansing.
Purgative (pur'ja-tive). An agent producing watery evacuations.
Purify (pu'ri-fi). To cleanse, to free from extraneous matter.
Purpura (pur'pu-rah). Hemorrhages into the true skin.
Purpuric (pur'pu-rik). Pertaining to purpura.
Purulent (pu'ru-lent). Having the character of pus.
Pus (pus). The fluid product of suppuration.
Pustular (pus'tu-lar). Consisting of pustules.
Pustule (pus'tul). An elevation of the cuticle with an inflamed base containing pus.
Putrefaction (pu-tre-fak'shun). Organic decomposition; decay.
Putrid (pu'trid). Showing putrefaction; rotten.
Pyemia (pi-e'me-ah). A condition in which pyogenic bacteria circulate in the blood and form abscesses wherever they lodge.
Pyogenic (pi-o-jen'ik). Developing or secreting pus.
Pylorus (pi-lo'rus). The lower orifice of the stomach leading into the small intestines.
Pyrosis (pi-ro'sis). A gastric burning pain with eructations or belching.
Pyuria (pi-u're-ah). The pressure of pus in the urine.
Radial (ra'de-al). Pertaining to the radius.
Radicle (rad'ik-l). The primary root or stem of the embryo.
Radius (ra'de-us). The small bone of the forearm.
Ramification (ram-e-fi-ka'shun). Branching of an organ or a part.
Ramollescence (ram-ol-les'sense). Softening of a part.
Rancid (ran'sid). Fetid or sour, as fat.
Rarefaction (rar-e-fak'shun). Decreasing the density of air.
Reaction (re-ak'shun). Responsive action.
Recreation (rek-re-a'shun). Refreshment of strength and spirits after toil.
Rectum (rek'tum). The lower part of the large intestine.
Rectus (rek'tus). In a straight line. Name of certain muscles.
Recumbent (re-kum'bent). Reclining.
Recuperation (re-ku-per'a-shun). Convalescence; return to health.

Recurrent (re-kur'rent). Returning after intermissions, as a fever.
Reducible (re-du'si-bl). Capable of reduction.
Refrigerant (re-frij'er-ant). A medicine that allays fever or heat.
Regimen (rej'i-men). The methodic use of food.
Regurgitation (re-gur-ji-ta'shun). An eructation or throwing back. Vomiting.
Rejuvenescence (re-ju-ve-nes'sense). A renewal of youth.
Relapse (re-laps'). A recurrence of a disease during convalescence.
Relaxation (re-laks-a'shun). Diminution of tension; languor; a looseness.
Remission (re-mish'un). A temporary subsidence of disease or pain.
Remittent (re-mit'ent). Alternately abating and returning.
Renal (re'nal). Pertaining to the kidneys.
Reproduction (re-pro-duk'shun). The begetting of young.
Residual (re-zid'u-al). Remaining.
Residue (rez'i-du). That which remains.
Residuum (re-zid'u-um). The balance or remainder.
Resin (rez'in). A somewhat hardened substance usually of a brownish or amber color, existing in nearly all plants and abundant in many.
Resinoid (rez'in-oid). Resembling resin.
Resinous (rez'in-us). Having the nature of resin.
Resolvent (re-solv'ent). That which has the power to disperse inflammation.
Respiration (res-pi-ra'shun). Inspiration and expiration of air by the lungs.
Respiratory (re-spir'a-to-re). Pertaining to respiration.
Restorative (re-stor'a-tive). Having the power to renew strength and vigor.
Resuscitation (re-sus-si-ta'shun). The bringing to life of one apparently dead.
Retching (rech'ing). An unsuccessful attempt at vomiting.
Reticulated (re-tik'u-la-ted). Having net-like meshes.
Retina (ret'i-nah). Internal membrane of the eye.
Retinitis (ret-i-ni'tis). Inflammation of the retina.
Retraction (re-trak'shun). Shortening; drawing backward.
Retroflexion (re-tro-flek'shun). A bending or flexing backward.
Retrograde (ret'ro-grade). Receding or going backward.
Retroversion (re-tro-ver'shun). A turning back.
Revivification (re-viv-i-fi-ka'shun). Resuscitation; renewal of life; the act of recalling to life.
Revulsion (re-vul'shun). The withdrawal of blood from a diseased to a healthy part.
Rheum (room). An increased action of the excretory vessels of any organ.
Rheumatism (ru'ma-tism). A disease with fever, pain, inflammation and swelling of the joints.
Rheumatoid (ru'ma-toid). Resembling rheumatism.
Rhizome (ri'zom). A subterranean stem.
Rhizomelic (re-zom'el-ik). Affecting the roots of members.
Rhizopoda (ri-zo-po'dah). Same as sarcodina.
Rhythm (rith'm). A measured periodic movement.
Rigidity (ri-jid'i-te). Stiffness; immobility.
Rigor (ri'gor). A violent chill.
Rochelle Salt (ro-shel' salt). The tartrate of potash and soda.
Roseola (ro-ze'o-lah). A rose-colored efflorescence on the skin.
Rotation (ro-ta'shun). Turning on the axis.
Rotation-joint. (ro-ta'shun-joint). A lateral ginglymus.
Rotator (ro-ta'tor). A muscle turning a part.
Rubefacient (ru-be-fa'shent). A medicine that reddens the skin.
Rudimentary (ru-di-men'ta-re). Undeveloped; not formed.
Rupia (ru'pe-ah). A syphilitic eruption with incrusted foul ulcers.
Rupture (rup'chur). The breaking or laceration of an organ.
Sabadilla (sab-a-dil'ah). The dried seeds of schoenocaulon officinale. It is a drastic cathartic.
Saccharine (sak'kah-rine). Containing sugar.
Sacrum (sa'krum). The large triangular bone above coccyx.
Salicylate (sal-i'sil-ate). A salt of salicylic acid.
Saline (sa'lin). Salty; containing salt.
Saliva (sa-li'vah). The secretion of the salivary glands. Spittle.
Salivation (sal-i-va'shun). The act of producing an increased secretion of saliva.
Salutary (sal'u-ta-re). Promotive of health.
Sanguine (san'gwin). Hopeful; cheerful.
Sanies (sa'ni-ez). A thin, reddish discharge from wounds or sores.
Sanitary (san'i-ta-re). Pertaining to health.
Sanitation (san-i-ta'shun). The act of making healthy.
Santonica (san-ton'i-ka). The flowerheads of Artemesia pauciflora; levant wormseed. It is a vermifuge.
Santonin (san'ton-in). The active principle of santonica.
Saphena (saf-e'nah). A name given to two large veins of the leg.
Saprophyte (sap'ro-fite). A plant deriving its sustenance from dead organic matter.
Saprophytic (sap-ro-fit'tik). Pertaining to saprophytes.
Sarcodina (sar-ko-di'nah). A class of protozoa moving and feeding by means of pseudopodia.
Saturated Compound (sat'u-ra-ted kom'pound). A chemic compound in which the combining capacities of all the elements are satisfied.
Scapula (skap'u-lah). A large, flat, triangular bone of the shoulder.
Schizomycetes (skiz-o-mi-se'tez). The fission fingi; bacteria.
Sciatic (si-at'ik). Pertaining to the hip.
Scirrhus (skir'us). A hard form of carcinoma.
Scleroderma (skle-ro-der'mah). A chronic indurated skin disease.
Sclerotic (skle-rot'ik). The firm, white, outer coat of the eye.
Scorbutic (skor-bu'tik). A person affected with scurvy.
Scrofula (skrof'u-lah). A constitutional condition with grandular tumor and a tuberculous tendency.
Scrofulous (skrof'u-lus). Affected with scrofula.
Scrotum (skro'tum). The pouch containing the testes.
Scurvy (skur've). A form of purpura due to deficient and improper diet.
Scutiform (sku'ti-form). Having the form of a shield.
Sebaceous (se-ba'shush). Pertaining to fat or suet.
Seborrhea (seb-or-re'ah). An abnormal secretion of the sebaceous glands.
Secretion (se-kre'shun). Function of glands and follicles. Substance secreted.
Secretory (se'kre-to-re). Performing secretion.
Sedative (sed'a-tive). Soothing. An agent allaying irritability.
Sedentary (sed'en-ta-re). Occupied in sitting.
Sediment (sed'i-ment). Matter settling from a liquid.

Seidlitz Powder (sed'litz pow'der). An aperient compound effervescing powder containing potassium bitartrate and sodium carbonate.
Semiflexion (sem-i-flek'shun). Bending half over.
Seminal (sem'i-nal). Pertaining to seed or semen, or to the elements of reproduction.
Senile (se'nil). Pertaining to old age.
Sensitive (sen'si-tive). Capable of feeling.
Sensual (sen'shu-al). Pertaining to or affecting the senses or bodily organs of perception.
Sepsis (sep'sis). Infection of the human system from putrid matter in the blood.
Septic (sep'tik). Relating to sepsis.
Septum (sep'tum). A dividing membrane or wall.
Sequel (se'kwel). A supervening disease.
Sequela (se-kwe'la). The results of a disease.
Seromucous (se-ro-mu'kus). Composed of serum and mucus.
Serous (se'rus). Having the nature of serum.
Serratus (ser-a'tus). A muscle of the thorax.
Serum (se'rum). The fluid constituent of the blood separated by coagulation.
Sewage (su'aj). The refuse matter carried off in a sewer.
Sewerage (su'er-aj). The system of sewers.
Sexual (seks'u-al). Pertaining to sex.
Sexuality (seks-u-al'i-te). The collective differences which in individuals make one male and another female.
Sialogogue (si-al'o-gog). A medicine which promotes the flow of saliva.
Silica (sil'ik-ah). Silicon dioxia, found in quartz.
Simulation (sim-u-la'shun). The counterfeiting of disease.
Sinapism (sin'a-pism). A mustard plaster.
Sinew (sin'u). The tough fibrous tissue which unites a muscle to a bone.
Sinus (si'nus). A hollow, cavity, recess or pocket.
Skeptic (skep'tik). One who doubts the truth of any statement.
Slough (sluf). The separated dead matter in an ulceration.
Sloughing (sluf'ing). The formation of a slough.
Soda Bicarbonate (so'dah bi-kar'bon-ate). Baking soda. It is antipyretic and antiseptic.
Solidism (sol'id-ism). The theory that ascribes disease to condensation or rarefaction of the solid tissues.
Soluble (sol'u-ble). Capable of being dissolved.
Solution (so-lu'shun). The critical period of a disease. A dilution.
Solvent (sol'vent). A fluid that dissolves or makes a solution of any other body.
Somnolence (som'no-lense). The condition of drowsiness.
Sonorous (so-no'rus). Resonant; ringing.
Soporific (sop-or-rif'ik). A medicine that has the quality of inducing sleep.
Sordes (sor'dez). Foul matter; execretions. The dark brown matter that gathers on the tongue and teeth in low fever.
Spasm (spazm). A convulsive muscular contraction.
Spasmodic (spaz-mod'ik). Sudden; violent; over-strained; unnatural.
Specific (spe-sif'ik). Peculiar; special. A remedy of peculiar value.
Spectrum (spek'trum). A color-band from a ray of decomposed light.
Speculum (spek'u-lum). An instrument for dilating and keeping open certain parts of the body to facilitate examination.
Spermaceti (sper-mak'se-te). A fatty substance from the head of the sperm whale used as an emollient.
Sphincter (sfingk'ter). A muscle constructing an orifice.
Spinal (spi'nal). Of or pertaining to the backbone.
Spinous (spi'nus). Pertaining to the spine.
Spontaneous (spon-ta'ne-us). Taking place without aid or volition.
Sporadic (spo-rad'ik). Occurring singly or apart from other things of the same kind; separate.
Sputum (spu'tum). Expectorated matter. Spittle.
Squamous (skwa'mus). Covered with or consisting of scales.
Stagnation (stag-na'shun). Cessation of motion.
Stearin (ste'ar-in). A compound of stearic acid and glyceryl found in the harder animal fats.
Stench (stench). An ill smell; an offensive odor.
Stercoraceous (ster-ko-ra'shus). Having the nature of feces.
Sterility (ster-il'i-te). The condition of being barren.
Sterilization (ster-il-iz-a'shun). The destruction of germs.
Sternum (ster'num). The flat bone of the breast.
Stertorous (ster'tor-us). Breathing with a sonorous sound.
Stethoscope (steth'o-skope). A tube for conveying sounds in auscultation.
Sthenic (sthen'ik). Strong; active.
Stiff-neck (stif-nek). See torticollis.
Stigmatism (stig'ma-tizm). A condition of the refractive media of the eye in which rays of light from a point are accurately brought to a focus on the retina.
Stimulant (stim'u-lant). Anything which stimulates.
Stimulate (stim'u-late). To excite the organic action of. Incite; urge; instigate.
Stimulus (stim'u-lus). Anything exciting an organ.
Stomach (stum'ak). The chief digestive organ of the body.
Stomachic (sto-mak'ik). A stimulant to the stomach.
Stomatitis (stom-a-ti'tis). Inflammation of the mouth.
Stool (stul). A discharge from the bowels.
Strabismus (stra-bis'mus). A condition in which the visual axes fail to meet at the objective point from inco-ordination of the eye-muscles; squint.
Strangulation (stran-gu-la'shun). A choking or throttling.
Strangury (stran'gu-re). A painful discharge of urine.
Strata (strat'ah). Plural of stratum.
Stratum (stra'tum). A layer of lamina.
Stricture (strik'tur). The morbid contraction of a passage of the body.
Stroma (stro'mah). The foundation tissue of an organ.
Strumous (stru'mus). Scrofulus.
Strychnia (strik'ni-ah). An alkaloid of nux vomica.
Stupor (stu'por). The condition of insensibility.
Styloid (sti'loid). Resembling a stylus.
Stylomastoid (sti-lo-mas'toid). Pertaining to the styloid and mastoid processes.
Stylus (sti'lus). A sound.
Stype (stip). A cotton tampon.
Styptic (stip'tik). Having the property of checking hemorrhage. A medicine that causes vascular contraction of the blood-vessels.
Subacid (sub-as'id). Slightly acid.
Subclavian (sub-kla've-an). Under the collar-bone.

Subcutaneous (sub-ku-ta'ne-us). Under the skin.
Sublimate (sub'li-mate). The product of sublimation.
Sublimation (sub-li-ma'shun). Vaporization and recondensation.
Sublingual (sub-lin'gwal). Beneath the tongue.
Submaxillary (sub-maks'il-a-re.) Beneath the inferior maxilla.
Subnormal (sub-nor'mal). Below the normal.
Subordination (sub-or-di-na'shun). Under control.
Subsultus (sub-sul'tus). Any morbid tremor or twitching.
Sudamina (su-dam'i-nah). Minute transparent vesicles arising on the skin toward the favorable termination of various diseases which have been attended by perspiration.
Sudoriferous (su-dor-if'er-us). Carrying sweat.
Sudorific (su-dor-if'ik). A medicine which produces sweat.
Suffocation (suf-fo-ka'shun). A stoppage of respiration.
Sulphate (sul'fate). A salt of sulphuric acid.
Sulphid (sul'fid). A combination of sulphur with an element.
Sulphurated (sul'fu-ra-ted). Combined with sulphur.
Superficial (su-per-fish'al). Confined to the surface.
Supernatural (su-per-nat'u-ral). Above the power of natural laws.
Supervene (su-per-vene'). To come upon as something extraneous; to be added to.
Suppository (sup-poz'i-to-re). A solid medicine melting at body temperature for introduction into the rectum or the vagina.
Suppression (sup-presh'un). Concealment; retention.
Suppurate (sup'pu-rate). To generate pus.
Suppuration (sup-pu-ra'shun). The formation of pus.
Surgery (sur'jer-e). Branch of treatment by operative procedures.
Susceptible (sus-sep'ti-ble). Sensitive to an influence; liable to become affected with a disease.
Suture (su'ture). Junction of cranial bones. In surgery, a stitch.
Symmetry (sim-me-tre). A harmonious correspondence of parts.
Sympathetic (sim-pa-thet'ik). Reciprocal action by different parts of the body.
Symptom (simp'tum). Any affection which accompanies disease. A perceptible change in the body or its functions.
Symptomatic (simp-to-mat'ik). Pertaining to a symptom.
Synchronous (sin'kro-nus). Occurring at the same time.
Syncope (sin'ko-pe). Swooning or fainting; a temporary suspension of respiration and circulation.
Syphilis (sif'il-is). A chronic, infectious venereal disease, which may also be hereditary.
Syphilitic (sif-i-lit'ik). Pertaining to or infected with syphilis.
Syphon (si'fon). A tube or pipe.
Syrup (sir'up). A concentrated solution of sugar in an aqueous fluid.
System (sis'tem). Methodic arrangement of parts. The animal economy.
Systole (sis'to-le). The contraction of the heart and arteries.
Taenia Solium (te'ne-ah so'le-um). The common long tapeworm.
Taint (taint). An infection; spot; blemish.
Tampon (tam'pon). A plug of lint or cotton, etc.
Tartar (tar'tar). A deposit incrusting the teeth, composed chiefly of phosphate of calcium.
Teichopsia (ti-kop'se-ah). Temporary dullness of sight with subjective images, often an accompaniment of migraine.
Temple (tem'ple). Flat, depressed portion of the head between the eye and the ear.
Temporal (tem'po-ral). Pertaining to the temple.
Temporalis (tem-po-ra'lis). The temporal muscle.
Tenacious (te-na'shus). Adhesive; tough.
Tepid (tep'id). About blood heat.
Teratism (ter'a-tism). An anomaly of conformation, whether congenital or acquired; a monstrosity.
Tetanic (te-tan'ik). A medicine which acts on the nerves and through them on the muscles.
Tetanus (tet'a-nus). A disease with spasmodic and continuous contraction of the muscles.
Textural (teks'tur-al). Pertaining to any tissue.
Thalamus (thal'a-mus). A mass of gray matter at the base of the brain projecting into and bounding the third ventricle.
Thein (the'in). Active principle of tea; same as caffein.
Theobroma (the-o-bro'mah). A genus of trees. The seeds of theobroma-cacas furnish chocolate and cocoa.
Therapeutics (ther-a-pu'tiks). That branch of medical science which relates to the discovery and application of remedies for diseases.
Thoracic (tho-ras'ik). Pertaining to the chest.
Thorax (tho'raks). The bones of the chest.
Thrombus (throm'bus). A blood clot in a vessel at the point of obstruction.
Thyme (time). See thymus.
Thymus (thi'mus). A genus of labiate plants. A granular organ in the anterior superior mediastinum, usually disappearing in adult life.
Thyroid (thi'roid). Scutiform; shield-shaped.
Tincture (tink'tur). Spirits containing medicinal substances in solution.
Tissue (tish'u). An aggregation of similar cells and fibers forming a distinct structure.
Tonic (ton'ik). A medicine which tends to restore normal tone.
Tonsils (ton'sils). The glands in the sides of the throat.
Torpid (tor'pid). Having lost motion or the power of exertion and feeling; dull; sluggish.
Torpor (tor'por). Abnormal inactivity.
Torsion (tor'shon). The act of twisting.
Torticollis (tor-ti-kol'lis). Contraction of cervical muscles with bending of head.
Tourniquet (toor'ni-ket). An instrument to compress arteries.
Toxin (toks'ine). A poisonous albumin produced by bacterial action.
Trachea (tra'ke-ah). The wind-pipe.
Tracheotomy (tra-ke-ot'o-me). The operation of making an opening into the wind-pipe, as in cases of suffocation.
Trachoma (tra-ko'mah). Granular lids; a form of conjunctivitis.
Transection (tran-sek'shun). A cross-section.
Translucent (trans-lu'sent). Partly transparent.
Transpiration (tran-spi-ra'shun). The act or process of transpiring.
Transudate (trans'u-date). A substance resulting from transudation.
Transudation (trans-u-da'shun). An oozing of a fluid through a membrane, especially a serum through vessel walls.
Transude (tran-sued'). To pass through the pores.
Transverse (trans-vers'). Lying across.
Traumatic (traw-mat'ik). A medicine useful in the cure of wounds.

Traumatism (traw'ma-tizm). The condition of one suffering from injury.
Tremor (trem'or). An involuntary trembling.
Triturate (trit'u-rate). To bruise. To rub or grind to a powder.
Tubercle (tu'ber-kl). A small eminence. A small nodule of granular cells constituting the specific lesion of the tubercle bacillus.
Tuberculosis (tu-ber-ku-lo'sis). An infectious disease due to a specific bacillus, characterized by the formation of tubercles.
Tumefaction (tu-me-fak'shun). A swelling of a part.
Turbidity (tur-bid'i-te). The condition of being troubled or disturbed.
Turpentine (tur'pen-tine). A substance taken from the pine tree. It is antiseptic and stimulant.
Tympanic (tim-pan'ik). Pertaining to the tympanum.
Tympanum (tim'pa-num). The drum of the ear.
Typhlitis (tif-li'tis). Inflammation of the cecum.
Typhoid (ti'foid). A condition of great muscular weakness.
Typhus (ti'fus). A contagious fever.
Typical (tip'ik-al). Characteristic.
Tyrotoxicon (ti-ro-toks'i-kon). A ptomaine from decomposed milk and cheese.
Ulcer (ul'ser). Suppuration upon a free surface; an open sore.
Ulcerate (ul'ser-ate). To produce an ulcer.
Ulceration (ul-ser-a'shun). The process of ulcer-formation.
Ulcerous (ul'ser-us). Having the character of an ulcer.
Ulna (ul'nah). The large bone of the forearm.
Ulnar (ul'nar). Pertaining to the ulna.
Umbilicated (um-bil'i-ka-ted). Having a depression like the navel.
Umbilicus (um-bi-li'kus). The navel; the round depressed cicatrix in median line of abdomen.
Unction (ungk'shun). The act of anointing, an ointment.
Unctuous (unk'shus). Greasy.
Unguentum (un-gwent'um). An ointment; a soft, fatty medicated mixture.
Unilateral (u-ne-lat'er-al). Affecting but one side.
Urate (u'rate). A combination of uric acid with a base.
Urea (u're-ah). An animal substance found in urine.
Uremia (u-re'mi-ah). The symptoms due to a tonic condition of the blood from accumulation of substances normally excreted by the kidneys.
Uremic (u're-mik). Due to or marked by uremia.
Ureter (u-re'ter). The excretory duct of the kidneys.
Urethra (u-re'thra). The excretory canal of the bladder.
Urethral (u-re'thral). Pertaining to the urethra.
Urethritis (u-re-thri'tis). Inflammation of the urethra.
Uric Acid (u'rik a'sid). The acid contained in the urine.
Urinary (u'ri-na-re). Of or pertaining to urine or the organs which secrete it.
Urine (u'rin). The excretion of the kidneys.
Urinemia (u-ri-ne'mi-ah). The presence of urinary constituents in the blood.
Uriniferous (u-ri-nif'er-ous). Producing and carrying urine.
Urticaria (ur-ti-ka'ri-ah). Nettle-rash; a skin eruption with itching lasting only a short time.
Uterine (u'ter-in). Pertaing to the uterus.
Uterus (u'te-rus). The womb; the hollow female organ of gestation.
Uvula (u-vu-la). The soft part of the palate.
Vaccination (vak-si-na'shun). Inoculation with vaccine to protect against small-pox.
Vaccine (vak'sine). Any substance containing the virus of cow-pox.
Vagina (va-je'nah). The canal from the vulva to the uterus.
Valerian (va-le're-an.) A plant of the genus valeriana.
Valeriana (va-le-re-a'nah). A genus of plants; also the rhizome and rootlets of valeriana officinalis; it is an antispasmodic and stimulant.
Valerianate (val-e're-an-ate). A salt of valerianic acid.
Varicose (var'i-kos). Swollen; knotted.
Varioloid (var'e-o-loid). The slight form of small-pox as modified by vaccination.
Vascular (vas'ku-lar). Pertaining to vessels.
Venesection (ve-ne-sek'shun). The opening of a vein for the purpose of letting blood.
Venous (ve'nus). Pertaining to a vein.
Ventilation (ven-ti-la'shun). The supplyiing of fresh air.
Ventral (ven'tral). Belonging to the belly.
Ventricle (ven'trik-l). A small belly-like cavity.
Verbascum (ver-bas'kum). A genus of plants.
Vermicular (ver-mik'u-lar). Worm-like.
Vermiform Appendix (ver'mi-form ap-pen'diks). A worm-shaped tube opening into the cecum.
Vermifuge (ver'mi-fuj). An agent expelling intestinal worms.
Vertebra (ver'te-bra). A bone of the spinal column.
Vertigo (ver'ti-go). Giddiness; dizziness.
Vesicant (ves'i-kant). A blistering application or plaster.
Vesication (ves-i-ka'shun). The production of a blister.
Vesicle (ves'i-kl). A small blister or sac.
Vesicular (ve-sik'u-lar). Having vesicles.
Vesiculation (ve-sik-u-la'shun). The formation of vesicles.
Veterinary (vet'er-i-na-re). Pertaining to the art of healing or treating the diseases of domestic animals.
Vibration (vi-bra'shun). A swinging back and forth or rapidly repeated oscillatory movement.
Vicarious (vi-ka're-us). Taking the place of another. The assumption of the function of one organ by another.
Vidian Artery (vid'i-an ar'ter-e). A branch of the internal maxillary artery which passes through the vidian canal and is distributed to the pharynx and Eustachian tube.
Virile (vir'il). Pertaining to a man as distinguished from a woman.
Virulence (vir'u-lence). Noxiousness; malignity; injurious to life.
Virulent (vir'u-lent). Having the nature of poison.
Virus (vi'rus). Contagious poisonous matter, especially that produced by and capable of transmitting a disease.
Viscera (vis'se-ra). The contents of the body cavities.
Visceral (vis'sur-al). Pertaining to the viscera; that cavity of the body which contains the viscera.
Viscid (vis'sid). Sticky; having a thick or sticky consistency.
Viscus (vis'kus). Any organ inclosed within the cranium, thorax, abdominal cavity or pelvis.
Vision (vizh'un). Sight.
Visionary (vi'zhun-a-re). Imaginary; unreal; fantastic; fanciful; dreamy; whimsical.
Visual (viz'u-al). Pertaining to vision.
Vita (vi'tah). Life.
Vital (vi'tal). Pertaining to life.

Vitalism (vi'tal-izm). The theory that bodily functions are due to a distinct vital principle.
Vitality (vi-tal'i-te). The vital principle of life.
Vitals (vi'talz). The organs essential to life.
Vitiate (vish'e-ate). To render vicious, faulty, defective or impure.
Vivacity (vi-vas'i-te). Natural vigor. Power of living; longevity.
Vivisection (viv-i-sek'shun). Scientific dissection of or experimentation upon livlng animals.
Void (void). To emit; to send out; to evacuate.
Volatile (vol'a-til). Having the quality of passing off by spontaneous evaporation.
Voluptuous (vo-lup'tu-us). Given to the enjoyment of luxury and pleasure. Indulging to excess in sensual gratifications.
Voracious (vo-ra'shus). Having an insatiable appetite.
Vulva (vul'vah). The external female genitals.

GENERAL ARRANGEMENT

Although contained in one volume this work is divided into twenty Books, which in their turn are subdivided into chapters or parts.

At the back of the whole work will be found a complete General Index of all matters contained in the different Books and their subdivisions, so that any disease or any remedy in any part of the work may be quickly located. But, in addition to this General Index, each chapter or part is prefixed with a special index of its own, thus giving immediate location of items to be consulted in the special subject at the time under consideration. For example, let us take the common disease Asthma. On consulting the General Index we find the main article to be on page 523. Turning to the index at the beginning of this chapter (Part VI of Book IV) we may find the causes, symptoms and varieties of Asthma.

If what we wish is not found in this general article, we again refer to the General Index; and we have special treatments of the disease in other parts of the work, such as Simple Remedies, Prescriptions, Homeopathic Treatment, Exercises, etc. This plan has been carried out all through the work.

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